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Information resource management for Naval shore activities : concept and implementation strategy

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THESIS

INFORMATION RESOURCE MANAGEMENT FOR NAVAL SHORE ACTIVITIES: CONCEPTS AND IMPLEMENTATION STRATEGY

by

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and
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September 1984

Thesis Advisor: Carl R. Jones

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Information Resource Management for Naval Shore Activities Concepts and Implementation Strategy

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MASTER OF SCIENCE IN MANAGEMENT

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September 1984

ABSTRACT

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I. EXECUTIVE SUMMARY

Data is recognized as a valuable organizational resource, one that should be managed like other resources of the activity, such as personnel, money, and supplies. According to John Diebold, the originator of the term Information Resource Management:

> It is clear that organizations which will excel in the 1980's will be those that recognize information as a major resource and structure it as efficiently as they do other assets. [Ref. 1: p. 51]

Providing accurate, relevant, and timely information entails a significant cost for the organization and presents a substantial challenge to the commanding officer of a Naval shore activity. Unfortunately, a precise, workable methodology for implementing an information system for an activity seems unavailable. In addition, qualified personnel are not normally available to implement IRM at the organizational level.

This thesis provides a methodology for implementation of Information Resource Management (IRM) at Naval shore activities. The research stemmed from the authors' perception that hardware procurement is overshadowing the determination of actual information system requirements. It is believed by the authors that many activities are procuring automated equipment without any thought as to <u>how</u> the equipment will be used.

A comparison of the history of information systems in both the private sector and the Federal Government is presented. The consensus of the authors of this thesis is that both the private sector and government organizations

have much the same problems in controlling hardware proliferation, system implementation, and software engineering techniques. The military seems to lag somewhat in taking advantage of technolcgical advances of recent years. The authors would submit that bureaucratic red-tape, stemming from numerous procurement regulations, has been a major factor for this phencmenon. However, the authors contend that the commanding officer can learn much from the chief executive officer in the civilian world on such issues as:

1. Procurement regulations and procedures.
2. The computer being perceived as the answer to any and all problems.
3. Increasing individual worker productivity as labor and personnel costs continue to rise.
4. Curtailing the regulations directed at large scale applications tc fit the shore activity's needs and requirements.
5. The importance of top management involvement and total commitment to any information system implementation.

Throughout, the authors try to emphasize the criticality of the organization identifying the information requirements and flcws <u>prior</u> to attempting any automation at the activity. Unless the commanding officer can fully specify the mission and objectives of the organization both in the near and long term, and convey those information requirements needed to accomplish those stated goals to the organization, <u>any</u> implementation strategy attempted by the activity is in jeopardy.

A systematic approach for the initial steps of an information system implementation through the automation stages is required by the ccmmanding officer. The authors have provided such a strategy. Additionally, a detailed

checklist summarizes the approach presented. The checklist is presented in a "bullet" format that asks specific and crucial questions of the commanding officer and the organizational department heads. The checklists could be reproduced and used as an aid in the formalization of the thought processes required to implement IRM at a Naval shore activity.

A discussion of the evolution of Information Resource Management procedes the authors' attempt to define IRM for the shore activity, utilizing the recently briefed (July 1984) Bases and Stations Architecture. The authors conclude by making a case for an IRM professional within the Navy officer corps; a view recently recommended by a council requested to review the Navy's Nontactical ADP programs, and formulate ways that the Navy might improve its program(s). [Ref. 2: pp. 1-19].

The implementation formalized by the authors consists of 6 steps:

1. <u>Command Support Development</u>. The commanding officer develops a command wide interest and understanding of Information Resource Management utilizing lectures, handouts, and Plan of the Day notes. Additionally, department heads, as key top management personnel, are motivated to support the implementation process.
2. <u>Strategic Requirements Development</u>. The commanding officer in consort with the department heads and users of the system, establish and define the strategic direction and objectives of the activity. The critcal success factors (CSF's) are identified that will support the attainment of the activity's goals.
3. <u>Information Requirements Planning</u>. Top management determines what information is needed to effectively manage the activity. The determination is based on a

strategic direction established during Strategic Requirements Planning and this step enables the commanding officer to identify information requirement alternatives and priorities for the activity.

4. Current Systems Evaluation. Only through a thorough understanding of the organization's present information flows will the command be able to forecast the system architecture required of the future information system. The process involves reviewing and documenting all present manual methods, as well as all currently installed automated systems.
5. Appoint an Information Analysis Project Team. A small, central group should coordinate the information analysis to ensure that an organized and structured approach be established to evaluate and categorize all information needs. This group would normally consist of the XO, information systems manager (ISM), and department heads.
6. Information Analysis. Information Analysis is a methodology which incorporates top management strategic direction to identify the data required for effective organizational control. The purpose of such an analysis is to consolidate the information requirements from each functional area, to avoid redundancy of data if possible, and identify what data is required from each functional area to perform the decision-making process in a more efficient and effective manner.

The following two pages are one of the checkoff lists presented in the thesis. This small offering provides an insight into the content and format of the "bullet" tables that follow Chapter VII, and allows the reader an opportunity to contemplate how the Tables might aid the commanding officer in formalizing the implementation procedure.

TABLE I

Command Support Development

DEFINE IRM.

What is IRM?

What is it going to do for the activity, for individual managers?

Define your philosophy, your goals and what the project will do.

What policies and procedures will be used to impart your philosophy throughout the acvtivity?

EMPHASIZE THE LONG TERM PERSPECTIVE

IRM will not be implemented overnight, but rather, over a timeframe defined in months.

IRM must be viewed as an evolutionary process that will depend on the current organization and its mode of operation.

Your view towards IRM will change through time.

The present organization must be viewed in terms of the future.

DEVELOP AN EDUCATION PROGRAM

How do we educate the personnel of the command?

Who should be included in the education program?

Table I

Command Support Development (cont'd)

DEVELOP A POA&M

How detailed should this plan be?

How long a period should the plan cover?

Will the plan bring about control, which will enable further time to plan?

Is the plan simple enough to succeed but specific enough to structure the actions of the activity.

Do department heads feel that the POA&M is realistic?

APPOINT AN INFORMATION SYSTEM MANAGER

Is there a qualified person presently assigned to the activity?

Is it possible to hire a qualified person?

If a present staff member must be assigned, can the person be expected to interact will all departments impartially.

How much time will the staff member be able to give to the project?

II. HISTORY OF INFORMATION SYSTEMS

A. INTRODUCTION

Commanding officers of most shore activities[1] are presently attempting to bring these organizations into the computer era. The many and varied advertized benefits of microcomputers and office automation equipment have provided the stimulus and justification for the procurement of thousands of dollars worth of hardware and software [Ref. 3: p. 5]. Microcomputers and other small computer systems are finding widespread use throughout the Navy [Ref. 2: p. 13].

Corporate leaders of American industry, on the other hand, appear to be charting a course in a somewhat different direction. The focus of corporate leaders is no longer on hardware and the quantity of output. Instead, the emphasis is on obtaining quality information. They are concerned with how information can be accessed and used more effectively by managers. [Ref. 4: p. 3] Management of the corporation's information has become the critical issue. "Data as a resource is moving from the pens of the theoreticions into the recommendations of the consultants and finally into the accepted world of the executive" [Ref. 5: p. vii]. A review of today's literature indicates that Information Resource Management and Information Engineering are the buzz words of the 1980's.

The reasons for the disparity between the present emphasis of corporate leaders and the commanding officers of shore activities warrant a brief discussion.

---

[1] Shore activities refers to those activities bounded within the the Bases and Stations Project. i.e.,-- Naval stations, Naval bases and air stations.

B. GROWTH OF THE COMPUTER

1. American Business

American business identified the potential of the computer at least as early as the 1960's. Corporations created data processing centers and gradually expanded the use of the computer. This expansion saw computers move from the large mainframe unit to the departmental minicomputer and then to the office microcomputer.

This expansion and growth process was described by Richard L. Nolan in his well known Harvard Business Review article, "Managing the Crisis in Data Processing". Nolan postulated that there are six stages of growth in an organization's DP function. These six stages cover the time from inception of the computer into the organization to mature management of all data resources [Ref. 6: pp. 1-8]. Additional information on Nolan's stages is provided in Chapter IV.

As technology improved and the costs of hardware decreased, computers and office automation equipment were installed throughout many organizations. However, this widespread use of small computer systems fueled the long standing debate over centralized or decentralized computing. Proponents of centralization argued that centralized computing ensured efficiency and permitted effective service to all users. Meanwhile, the proponents of decentralization argued that decentralized arrangements were profitable and improved departmental productivity. [Ref. 7: pp. 1-22]

As this debate continued, many corporations discovered that there was only a limited capability of interaction between this array of computers. Corporations were trying to operate with unrelated and incompatible hardware and software. Management had failed to recognize the critical nature of controlling the computer resource. Management and

control of the computer and the corporation's information resource had been overlooked. [Ref. 7: p. 325]

2. Federal Government

The federal government began utilizing the computer at much the same time as American industry. However, computer applications in the federal government were quickly identified as being unique. The size, scope and complexity of federal government applications presented serious questions in areas such as planning, policy, design and procurement. Solutions to these diverse questions were not easily found. In fact, confusion and disagreement followed any attempt to find the best means of improvement. As a result, Congress and the central management agencies (Office of Management and Budget and the General Services Administration), chose a "hard line" approach. Regulation was chosen as the best method of controlling and managing the federal computer resource. [Ref. 8: pp. 1-8]

C. FEDERAL REGULATIONS

Commanding officers of shore activities must comply with both federal regulations, as well as Department of Defense regulations. This dual centralized bureaucracy has restricted and discouraged innovative thinking in both computer applications and management [Ref. 8: p. 19].

The impact of the various federal regulations has created severe problems throughout the federal government. The age of some major computer systems is an example of one such problem. Dramatic improvements have been made in computer technology; yet, many government systems still operate as originally installed. [Ref. 8: pp. 21-27] The National Academy of Science (NAS) found obsolescence to be a major problem effecting the Navy. The NAS report stated:

> Too many Navy installations are operating with computing equipment produced in the 1960s; two generations of computers have been developed since then [Ref. 2: p. 4].

A specific example may be the Navy's supply system. The Navy Supply Systems computer systems have been described as technically out of date, overburdened and the achilles heel of the supply system [Ref. 9: p. 56].

A review of the major federal computer regulations allows the reader to grasp the magnitude of this centralized control. This review will also provide an insight into the commanding officer's perspective and a possible reason why most shore activities are only now progressing beyond the word processing stage.

1. The Brooks Act

The Brooks Act of 1965 established the basic framework for federal computer applications. Three agencies, General Services Administration (GSA), the Office of Management and Budget (OMB), and the National Bureau of Standards (NBS), were given significant authority over government-wide computer activities. The Brooks Act tasked each agency with specific responsibilities:

1. OMB--overall policy guidance;
2. GSA--procurement,funding,and disposal;
3. NBS--development of federal information processing standards. [Ref. 8: p. 20]

This highly centralized structure of authority and responsibilities resulted in a magnitude of difficulties at all levels of federal computer applications. A major difficulty was that the procurement process that evolved from the Brooks Act was long and complicated, and actually lengthened the time it took to procure equipment [Ref. 9: p. 59]. In addition, the constant scrutiny by higher authority

restricted agency and activity managers by allowing little room for operational level decisions. Areas as wide spread and diverse as procurement and personnel management were subject to federal micromanagement. [Ref. 8: pp. 21-23]

2. The Paperwork Reduction Act

The Paperwork Reduction Act of 1980, provided some needed guidance in the area of computer management. This law, in addition to strengthening the government's efforts at paperwork management, mandated the preparation of a five year plan for data processing and telecommunications. [Ref. 8: pp. 9]

This law implies that federal agencies have not utilized strategic planning in managing the computer resource. Some critics have been much more specific. Robert V. Head stated: "Attempts at strategic planning by federal agencies have...been sporadic and largely ineffective" [Ref. 8: p. 9]. A committee from the National Academy of Sciences studied the Navy's Nontactical Automated Data Processing Policy, Organization, and Management and found much the same problem.

> NAVDAC (and indeed all aspects of the Navy and the government/congressional procurement/oversight process) appears to have been too rigidly focused on computer hardware and, to a lesser extent, applications software, while having paid too little attention to policy development, strategic planning, and the potential of management-level information systems [Ref. 2: p. 15].

The Paperwork Reduction Act also addressed the concept of information management. Each agency is required to designate a single individual who is responsible for all the agency's information systems. This is to include data processing, records management, forms control, and all areas dealing with information. [Ref. 8: p. 34]

3. The Federal Information Resource Management Regulation (FIRMR)

The Federal Information Resource Management Regulation (FIRMR) is the most recent regulation in the area of information resources. Effective 1 April 1984, this regulation provides a single directive concerning the effective management of automatic data processing, office automation, records management and telecommunications. Its emphasis is on managing information throughout the life cycle (from collection or creation to disposal). This regulation is intended to provide a single, logically organized directive on Information Resource Management. [Ref. 10: p. 20994]

D. WHAT IS THE ISSUE ?

The Paperwork Reduction Act of 1980 and the FIRMR, address some of the management and control problems that industry has had previously, and are presently experiencing. These problems surfaced as small computer systems gained widespread use throughout organizations. Why then, is there now the proliferation of microcomputers at most shore activities? Is this a rational approach based upon industry's documented problems?

1. The Activity Perspective

The authors contend that the present proliferation of microcomputers at the activity level can be attributed to the fact that the Navy has not provided concise and workable guidance on managing the computer resource. The Bases and Stations Architecture indicates that the Navy is now looking to provide this guidance [Ref. 11: unmarked]. However, the authors perceive that it could be as long as 2-5 years before it will be fully implemented at the activity level. In the interim, there exists a critical need for guidance at the activity level. The NAS reported,

> Units at various levels within the Navy appear to have no place to turn to receive good advice on how their information systems might best be developed technically or to receive appropriate guidance in making the task changes that information systems require [Ref. 2: p.10].

This lack of guidance has perpetuated an activity perspective that is not consistent with that presently being implemented at the agency level of the government or the major systems command level of DOD.

The increased visibility of command of a major shore activity has contributed to this perspective. The implementation of the "Major Shore Command" policy in 1980, recognized the importance of this position and the critical need to ensure that only top performers were given these assignments. [Ref. 12: pp. 1-3]

The authors contend that this high level visibility has lead to an increased interest in shore activity management. Commanding officers are looking for methods to improve their decision making and the productivity of their organizations. In this regards, they are turning to the computer.

The authors feel that there are additional factors that have contributed to the increasing trend toward computerization. The following factors are particularly noteworthy:

1. Procurement regulations have been eased.
2. Hardware costs have continued to decrease.
3. The computer is perceived as the answer to any and all problems.
4. The Bases and Stations Architecture encourages commanding officers to procure microcomputers.
5. Labor costs have continued to increase.

In the authors' opinion, this trend towards increased computerization is not consistent with the guidance provided

in the Paperwork Reduction Act of 1980, the FIRMR, or the findings of industry. The reason for the inconsistency is that these regulations are directed at the large scale applications found at the agency level of government. They are not addressed to the individual activity or command. Guidance for individual activities or commands will only be prepared after each agency is able to develop its own guidelines. This process is time consuming and mired in the bureaucratic process.

E. A FRAMEWORK FOR IMPROVEMENT

Many shore activities are presently caught up in moving from the "manual method" to the computer era. Management and control of the computer resource is not presently a problem. However, the warning signs are unmistakable. In the opinion of the authors, activities must follow a methodology in their transition to the computer age. Failure to do so will result in wasted resources, increased user dissatisfaction, and will seriously impede the eventual transition to the information era.

Planning is critical to this process. Industry has recognized this fact and the upper levels of government are also acknowledging this requirement. This thesis addresses this problem and provides a methodology that is applicable for use by the activity level commanding officer and staff. The methodology will be directed at the implementation of small computer systems. It is designed for incorporating the microcomputer into an effective information system. Although this methodology does not specifically address office automation and telecommunications, the methodology has some general applications to these areas.

III. THE COMMANDING OFFICER'S DILEMMA

A. INTRODUCTION

The Commanding Officer of a major shore activity is responsible for coordinating the many and varied functions of his organization. The diversity of these functions places the commanding officer of most shore activities in a role similar to that of a "city manager". However, the commanding officer is a professional military officer who normally has not had the training and experience of most city managers.

It is the opinion of the authors that command of a major shore activity is a particularly difficult assignment for most commanding officers. Success in this environment depends on the commanding officer's ability to demonstrate both effective leadership and management throughout his organization.

The authors would contend that effective management of this complex organization can be greatly enhanced by the use of automated systems and the realization that information, next to his personnel, is the commanding officer's most important resource. In addition to the traditional transaction type applications, the use of automated technolcgies can improve decision making by giving the commanding officer and his principal department heads, the right information, at the right time and at the most economical cost.

Various forms of office automation equipment and microcomputers are now being utilized by most shore commands [Ref. 2: p. 13]. However, the transition from the traditional "manual system" to an automated system may involve a certain degree of confusion in an organization. In most

cases, there are a number of problems that must be anticipated. These problems may be technological in nature (e.g., inadequate or incompatible equipment), but many problem areas will be largely managerial. [Ref. 13: p. 1] In this regards, the most significant problem will be that many commanding officers may have to alter their view of information [Ref. 2: p. 3].

In the opinion of the authors, the above paragraphs describe a scenario that places many commanding officers of shore activities in a precarious dilemma.

This chapter will present an explanation of the organizational structure of a typical shore activity. It will serve to display the magnitude and complexity of the environment in which a commanding officer must operate. It will also discuss a typical commanding officer's career progression and training. The final part of the chapter will address a number of issues that the authors perceive as obstacles to a commanding officer who may attempt to control his information resource.

The purpose of this chapter is to enable the reader to comprehend the scope of a major shore activity and the commanding officer's background, in order that an evaluation can be developed as to the need for Information Resource Management and the inherent difficulties that a commanding officer faces in implementing such a system.

B. SHORE COMMANDS

1. Organization

The commanding officer of a shore activity is responsible under Navy Regulations for the accomplishment of his command's mission. This mission, for a typical naval station , can be stated as:

....to provide, as appropriate, logistic support for the operating forces of the Navy and for dependent activities and other commands as assigned [Ref. 60: p. 1].

This broad statement tasks the commanding officer with responsibility for a wide range of diverse functions. Phase 1 of OP-094's Bases and Stations Architecture identified seventeen functions as applicable to typical naval shore activities [Ref. 11: unmarked]. These functions are listed in Table II .

TABLE II

Functional Areas

Billeting	Special Services
Staff Civil Engineer/ Port Services	Clubs and Messes
Administration	Supply
Security	Civilian Personnel
Comptroller	Air Operations
Port Services	AIMD
Transient Personnel	Safety
Brig	Staff and Support

[Ref. 11: unmarked]

Rarely will the commanding officer of a shore activity be responsible for all seventeen of these functions. Instead, the specific mission of his command will determine the exact functions that he must coordinate.

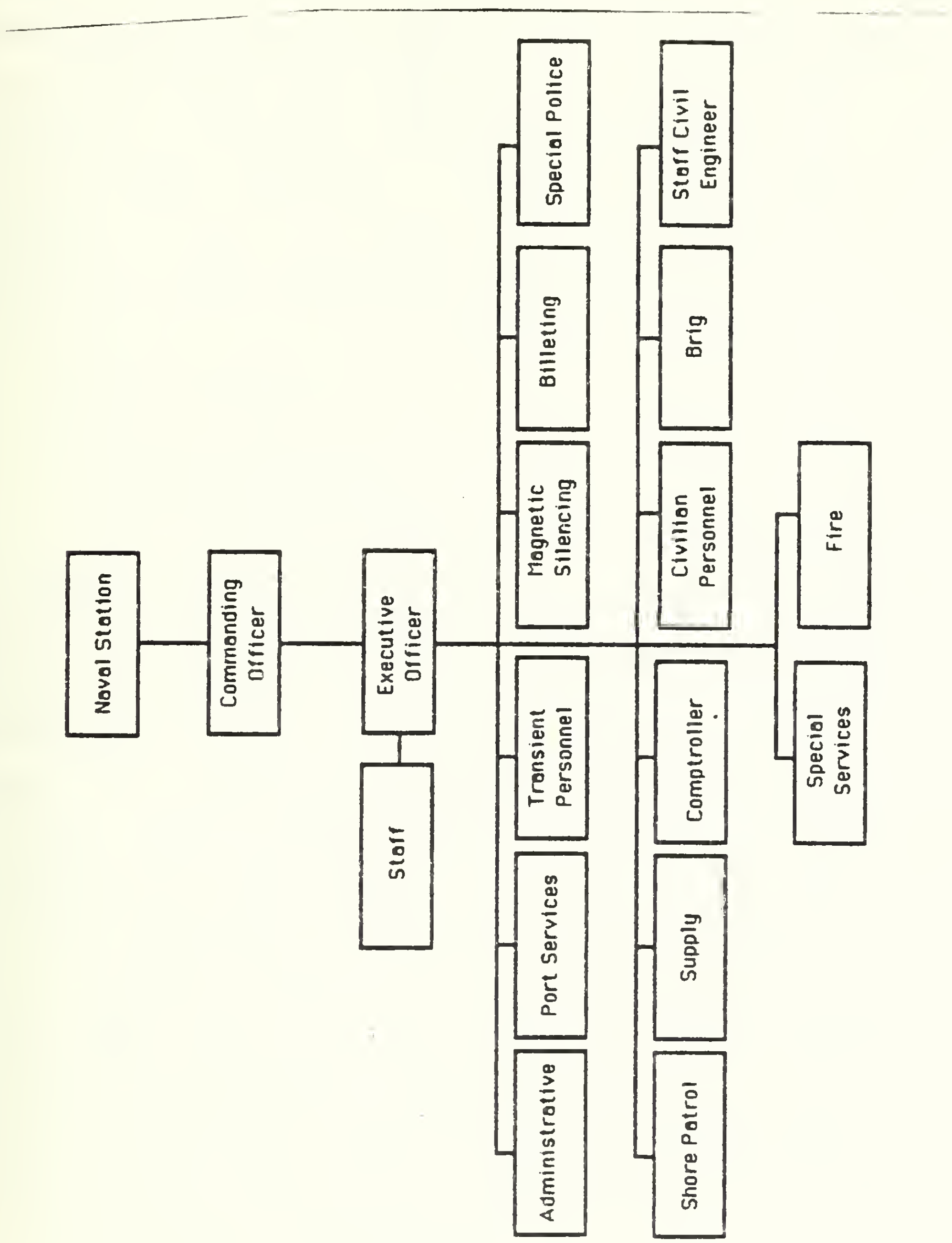
However, functions such as supply, staff civil engineer, security and administration are typically common to all activities [Ref. 11: unmarked].

Figure 3.1 depicts the organizational chart for Naval Station, Norfolk, Virginia, and serves to illustrate the various functional areas for which a typical commanding officer is responsible.

The authors contend that Figure 3.1 does not fully illustrate some vital organizational aspects of a shore command. A commanding officer must deal with both tenant commands and certain specialized commands. These activities, though not directly under the control of the commanding officer or even geographically located within his command, may provide a valuable service to the commanding officer. Consequently, he must constantly review and monitor the service provided by these activities.

In addition, Figure 3.1 does not convey a number of aspects of the commanding officer's city manager role. Many commanding officers are responsible for a large number of military family quarters. In many cases, this involves providing municipal services, utilities, recreation and security. The commanding officer must manage this area as economically as possible; while at the same time, recognizing the impact that this area has on the morale of his military personnel. [Ref. 13: p. 23]

Shore activities, particularly the industrial and large operating bases, are major consumers of energy. A shore commander must provide innovative and effective measures to conserve his energy resources. In the future, this area is likely to receive an increasing amount of visibility. This concern, just as the makeup of managing family housing, is not easily recognizable in reviewing the organizational chart.



[Ref. 60: Chart 1]

Figure 3.1 Organizational Chart--NAVSTA Norfolk.

A final critical role is not evident from the organizational chart--the commanding officer's civic responsibilities. Since the commanding officer is frequently the senior officer in a community, he is often looked upon as the chief executive officer of a large business in the community. He must therefore maintain a close and active role in civic affairs. However, this is not to be taken lightly. It is a role where the commanding officer is subject to public scrutiny and often a target for the politics which ebb and flow around him. [Ref. 13: p. 24]

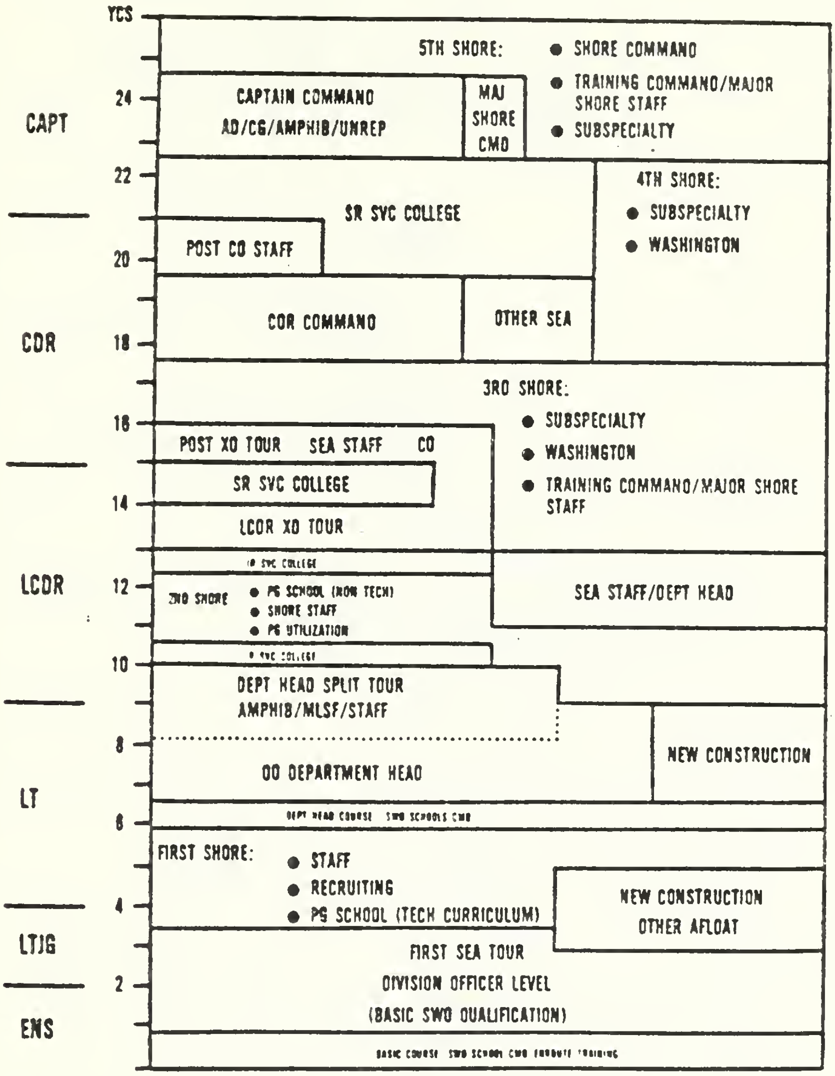
C. CAREER DEVELOPMENT

1. Duty Assignments

The commanding officer of a major shore activity is a professional military officer who has ascended through a career path involving many different assignments. This career progression will vary considerably depending upon the commanding officer's warfare specialty. Figure 3.2 through Figure 3.4 provides standard career paths for various warfare communities. James Hodges [Ref. 14: p. 38], reviewed the career progression for all unrestricted line officers and found that a typical career included:

1. A major command assignment around the 22-year mark,
2. Over 50% of service time will be in afloat/squadrons or in training for these units,
3. A Washington tour as a LCDR or above and,
4. A high percentage of subspecialty and staff duty for shore duty assignments.

The authors contend that the duty assignments of most commanding officers have not adequately prepared them for the challenge of managing a major shore activity. Instead, the training and experience is structured to

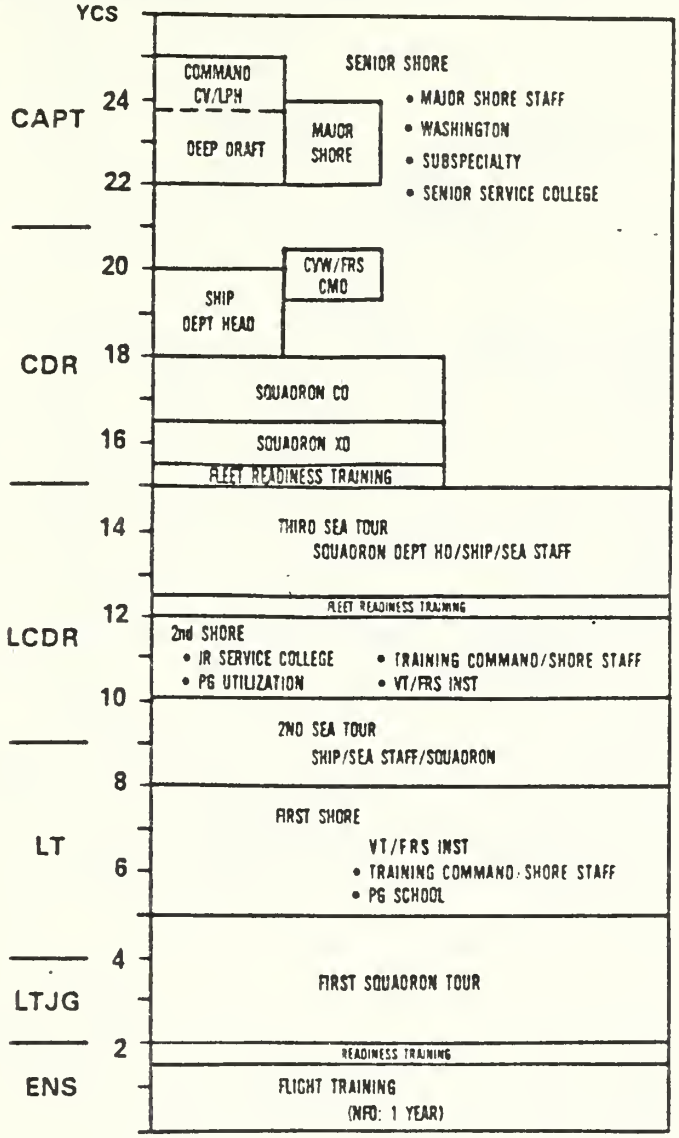


[Ref. 15: p. 34]

Figure 3.2 Surface Warfare Career Path.

prepare the officer for operational tours as executive officer and commanding officer.

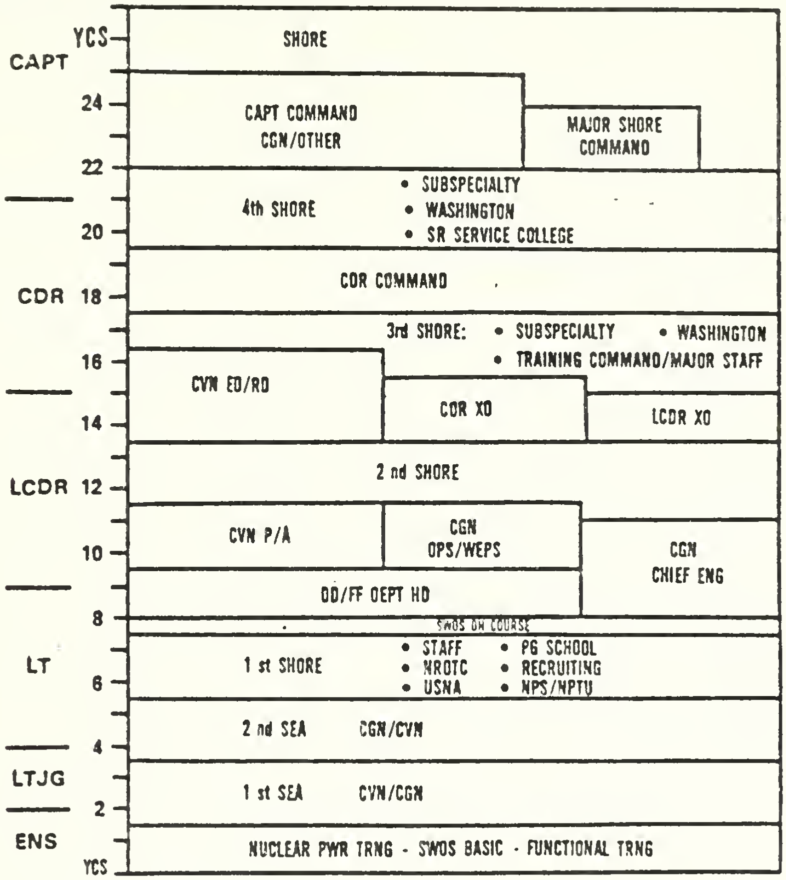
Various other authors support this contention. Hodges [Ref. 14: p. 44], found that the training provided



[Ref. 15: p. 45]

Figure 3.3 Aviation Career Path.

for sea/squadron assignments is primarily operationally oriented and specifically structured to develop the officer's knowledge of shipboard/squadron operations. Kay



[Ref. 15: p. 35]

Figure 3.4 Nuclear Surface Warfare Career Path.

[Ref. 13: p. 20], openly questioned the logic behind the premise that an officer was qualified to take over the reins of a major shore command without substantial or meaningful experience in the complex and specialized management demands of such an organization.

Shore duty assignments may be operationally oriented, but for most officers, they are likely to be in

other areas. Postgraduate education, instructor duty, staff duty and sub-specialty utilization represent some of the areas in which an officer will gain shore duty experience. These tours are normally assigned with regard to increasing responsibility, thereby enhancing an officers promotional opportunities based upon professional performance. [Ref. 14: p. 44]

The authors have offered this brief discussion to permit the reader to contrast the organization of a shore command with the previous assignments of a typical officer who may command a shore activity. The authors cannot discount the fact that excellent management and leadership skills were developed during the commanding officers operational tours. The authors' purpose is to give the reader an indication of the focus of assignments most commanding officers may have experienced prior to assuming responsibility for the shore activity.

2. Formal Training

Formal training for the commanding officer of a major shore activity was initiated in May 1978, when the Navy Civilian Personnel Command (NCPC) offered the first Prospective Commanding Officer (PCO) Shore Management Training Program. This three week course consisted of presentations addressing the various resource areas that a commanding officer could expect to encounter at a typical shore command.

This course is presently offered three times a year. Prospective commanding officers of major commands are required to attend and are given priority for obtaining quotas. Commanding officers of other shore commands may utilize the remaining quotas, with prospective executive officers of shore activities given the opportunity of filling any unused quotas. As of July 1984, 528

individuals[2] have completed the course.

It is the authors' contention that the PCO Shore Station Management Program is a positive step in preparing commanding officers for the challenges of managing a shore activity. However, the topic of information systems was not discussed until the May 1984 session. The authors feel that the exclusion of this topic for such a long time, has contributed to the confusion and difficulties now being experienced by many commanding officers who are trying to implement various information systems or Information Resource Management in particular. The authors feel that this topic is of major importance and that the commanding officer's need for training, education, and specific guidance in this area will only increase. In the future, as additional activities enter the "information age", it is conceivable that this increase will approach an exponential rate.

D. ADDITIONAL ISSUES

1. Introduction

The previous sections of this chapter have provided an insight into the complexity of the commanding officer's environment, as well as a glimpse of a commanding officer's previous duties and training. The authors feel that both of these topics must be considered when attempting to evaluate the commanding officer's ability to effectively implement an Information Resource Management system. However, the following issues, although less obvious, are also of concern.

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[2]This information obtained in a 27 August 1984 phone conversation with the NCPC course coordinator.

a. Tour Length

The average tour length for a commanding officer is 24-36 months [Ref. 15: p. 32]. It is the authors opinion that this relatively short period of time does not allow a commanding officer to become actively involved in all the various functional areas. He must instead, rely on the various department heads for guidance and recommendations. The commanding officer will focus his attention on those projects that he perceives to have an immediate urgency or on projects that can be easily completed during his "watch".

It is not the authors' desire to imply that focusing on urgent or high priority matters justifies criticism. Instead, this fact is brought out in order that the reader may see that a large part of the commanding officer's time is reactive [Ref. 16: p. 91]. This reactive nature of the commanding officer's job may preclude him from active involvement in the implementation of an automated information system.

In addition, the authors contend that many commanding officers will perceive the time required for the planning, documentation, and installation of an information system to be overwhelming and of little benefit from their short term perspective. As a result, they will not support Information Resource Management or they will delegate responsibility to such a low level that success is impossible. In either case, the short tour length, and the resultant short term perspective, impacts the commanding officer's view when considering implementation of an automated information system.

b. Types of Information

The authors contend that a commanding officer of an ashore activity must be concerned with two broad types of

information. The first type is the information that is required to produce the reports for higher authorities. The information that the commanding officer needs to effectively manage his command forms the second type of information.

The information that is required by higher authority is fairly well defined. The centralized structure of the Navy provides a chain of command that normally prescribes specific reporting requirements. However, this must be contrasted with the managerial requirements of the commanding officer. The information that the commanding officer needs to effectively manage his command is much more illusive. In most cases, the CO must extract this from the reams of reports that cross his desk. Reports, that are in many cases what subordinates perceive that the commanding officer needs or wants [Ref. 36: p. 46].

The authors contend that a commanding officer attempting to implement an Information Resource Management system must recognize the existence of these two types of information. The information used to prepare the reports to higher authority is, in most or many cases, also vital to his needs. However, these reports are normally in a format that is not meaningful or useful to decision making at the activity level. Consequently, he must ensure that strict attention is given to providing him the information that he needs and can use; while at the same time, minimizing duplication and overlap because the requirements for such information may not be fully coordinated.

c. Staff Guidance

Chapter II discussed the fact that commanders at the activity level have no source of guidance on how to develop or improve an information system. This is viewed by the authors as a major problem; one that presently contributes to such problems as incompatibility, poor documentation

and inconsistent information gathering. However, this situation is further complicated by the fact that the commanding officer has limited guidance and assistance in the general management of his command. He is accustomed to the operational Navy where specific rules and regulations were available; where he was expected to accomplish his mission, but always knew where to turn for assistance. However, the commanding officer is in a new environment. An environment where the lack of technical support is only part of his problem; secondary in some cases, to the fact that he lacks specific management guidance from his military superiors.

In dealing with the myriad of problems that confront him, the commanding officer interfaces with not only his immediate military superiors, but with the Civil Service Commission, an array of bureaus, agencies, boards and other offices. He often falls victim to duplicative and overlapping guidance on many issues. It can be said that he is in an environment where he must answer to what seems to be an endless line of "bosses". His natural sources of guidance and assistance are the various military staffs. However, those on the military staffs to whom he must refer his problems, frequently know less about managing a shore activity than he does [Ref. 13: p. 21].

The authors contend that the lack of both technical guidance and general management guidance are problems for a commanding officer in implementing Information Resource Management. While the technical guidance issue is being addressed, there appears to be little improvement in the area of managerial guidance. As a result, the commanding officer must structure any attempt at information management on the realization that he must determine his own priorities, establish his own goals, and meld the dollars, people and resources at his command to accomplish his activity's mission [Ref. 13: p. 21].

d. Centralization/Decentralization

A commanding officer attempting to implement an automated information system must be aware of the issues that fuel the debate over centralization versus decentralization of an organization's information resources. This debate has flourished for a number of years in the information systems community and has generally concluded that there is no "best" solution for an organization. Regardless, the centralization issue is generally recognized as having three separate aspects:

1. Control-- concerns the location of decision making in the organization,
2. Location-- concerns the site of equipment,
3. Function-- refers to the position of an activity within the structure of an organization [Ref. 7: p. 321].

The authors contend that it is vital for a commanding officer to recognize the implications of these issues. However, the authors perceive that the critical issue for a commanding officer of a major shore activity is the highly centralized and administratively complex nature of the U.S. Navy. Although the responsibility and autonomy of an individual commander is often cited as an indication of decentralization, the fact remains that the Navy is highly centralized in many matters. The stringent regulations imposed on most applications of automated information systems, as discussed in Chapter II, is a prime example of this fact.

A commanding officer who is interested in implementing an automated information system should logically follow a systems approach. However, the authors contend that in most cases, this will end in the requirement to

request authorization from some higher authority. Regardless of whether the request is for approval of the project or for additional funding to support the project, the bureaucratic process is time consuming and unpopular. Instead, it is easier to take a piecemeal or incremental approach; i.e., funding equipment whenever possible. But, unfortunately, this can lead to incompatibility or user dissatisfaction as the command must decide such questions as which department gets "automated" first, or what equipment to procure. However, this approach has become even more popular as the cost of small computer systems has decreased. The debate over centralization or decentralization of an organization's information resource has yet to be resolved, and will be around for some time [Ref. 7: p. 319]. The authors' intent in this discussion is to give the reader an indication of the additional implications facing the commanding officer of a shore activity.

E. CHAPTER SUMMARY

Chapter III has offered the reader a brief overview of the scope of a major shore command, an insight into the career progression of the individuals who command them, and a discussion of various factors that impact on a commanding officer's view of information management. The authors contend that the first two topics combine to make a major shore command a difficult assignment for many commanding officers. However, the commanding officer's task becomes substantially more difficult when coupled with the complications arising from factors such as:

1. Tour length,
2. Dual information requirements,
3. A lack of staff guidance and,
4. The centralization versus decentralization issue.

These additional factors bound a scenario where the commanding officer is in a precarious dilemma.

This chapter was developed solely to permit the reader to formulate a view as to the need for information management and the inherent difficulties in implementing an automated information system. Chapter IV will offer the reader a detailed discussion of the concept of Information Resource Management.

IV. INFORMATION RESOURCE MANAGEMENT

A. HISTORY

Over 400 years ago, Machiavelli observed:

> It must be considered that there is nothing more difficult to carry out, nor more doubtful of success, nor more dangerous to handle, than to initiate a new order of things. For the reformer has enemies in all those who profit by the old order, and only lukewarm defenders in all those who could profit by the new order. This lukewarmness arises partly from fear of their adversaries, who have the laws in their favor, and partly from the incredulity of mankind, who do not truly believe in anything new until they have had an actual experience of it. [Ref. 18: p. 385]

Information is an ingredient vital to good management. The sharply reduced cost of computer technology and the rapid improvements in the availability of useful technologies in the telecommunications and office automation areas, have created a very real opportunity to improve the effectiveness of corporate and nonprofit management through improved use of information by management. However, this opportunity has been difficult to exploit in the past two decades, and if anything, the task is becoming more difficult. [Ref. 4: p. 1]

The technological advances from the vacuum tube, to transistors, to integrated circuits and the complexities of the microelectronics technologies, have continued to advance and will impact on our way of life for years to come. But, additionally, over the past 30 years, the rapid evolution and spread of information systems technologies, has created a major, new set of managerial changes. Virtually all major, currently accepted conceptual frameworks for thinking about how to manage information have been developed since 1971 [Ref. 19: p. 1]. The earliest commercial application

of a computer information system occurred in 1952. Thirty years is a very short time for a new management profession to develop to maturity when one considers the amount of knowledge and change that has occurred in the fields of marketing, accounting, finance, and production, since their humble beginnings in the early 1900's.

In the early 60's and 70's, senior management, blinded by the cloud of technological jargon surrounding the computer field, abdicated its responsibilities somewhat, and let the data processing function grow as they attempted to come to grips with the information dilemma. Data processing, unfiltered by management control in many cases, produced predictable results. In too many cases, data processing became a bureaucratic empire, outside the mainstream of the organization, unresponsive to managements requirements as well as being economically unmanageable. [Ref. 20: p. 78]

Information was first placed in purely economic terms in 1963 by Adrian M. McDonough, a professor at the University of Pennsylvania's Wharton School of Finance and Commerce. The professor coined the phrase "information economics" to describe the notion of effectively using both stored knowledge and information obtained through data processing. The concept placed information in a purely economic framework by emphasizing the need to understand the demand for and the supply of information [Ref. 21: p. 15]. In classical economic terms, the factors of production were viewed as land, labor, and capital. In the modern age, these have become men, money, machines and material. In the future, it is safe to assume that information will be added, if it hasn't already, as the fifth factor of production [Ref. 1: p. 51].

Information processing activities account for about 70 percent of U.S. employment, and also account for more than

46 percent of the Gross National Product, according to recent figures from the National Science Foundation [Ref. 21: p. 15]. But most proponents of information as a resource, would be quick to point out that Management Information Systems (MIS), supposedly already provides the information desired when required. Current computer installations all purport to be information systems, and the majority of these in turn claim to be MIS's. A functional definition of a MIS might read: "A management information system is a formal system in the organization which provides management with the necessary reports to be utilized in the decision-making process" [Ref. 22: p. 192].

While any information system may collect, store, process, structure, and retrieve data, the ultimate goal of the system is to provide information for managers to assist them in making decisions. While most MIS's attempt to support managers in making decisions, the system in some instances may also make some of the repetitive decisions usually made at the lower levels of the organization [Ref. 24: p. 4]. Proponents of Information Resource Management feel that IRM will not follow the footsteps of MIS. The latter allowed information to be isolated from the real world. IRM, if implemented correctly, forces information to mirror reality. [Ref. 29: p. 74]

While there may be some arguments among data processor and information system managers as to the "correct" definition of MIS, most all will agree that management information systems have failed for the most part, to provide the information as advertised. This is not totally unexpected, since all technological and innovative uses of systems must have a testing period. Reasons for this failure include:

1. Lack of management involvement. Most studies indicate that information systems that succeed were

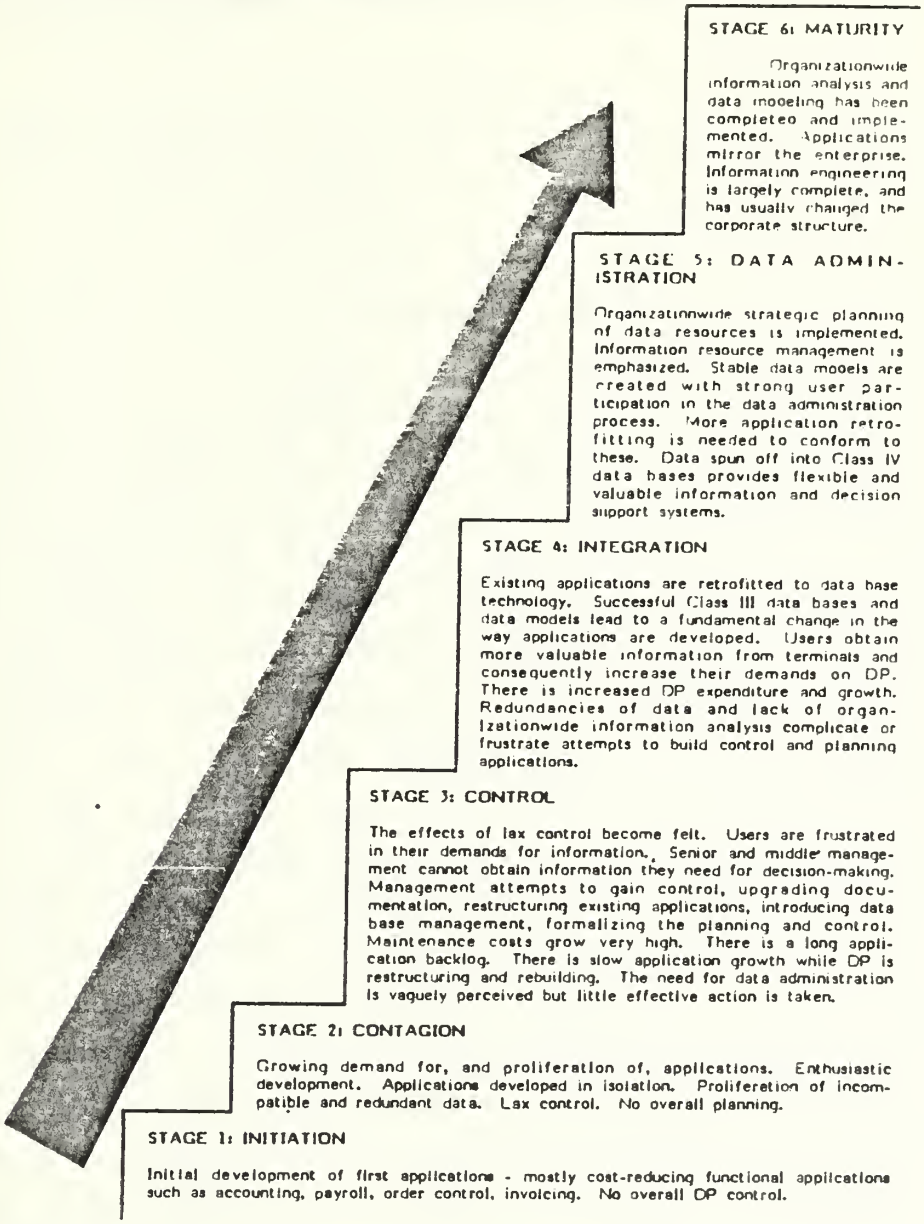
precisely those in which top management participated. Involvement included strategic planning, organizational arrangements, detailed operating plans and budgets, as well as follow-up to ensure compliance. [Ref. 22: p. 229]

2. Resistance to change. Unless users are persuaded that the information system and its associated computer(s), as a resource, can help them perform their duties in a more efficient and effective matter, they will not be receptive to computer solutions to problems. [Ref. 18: p. 590]
3. Lack of qualified information systems managers. Most information managers were former data processing personnel that had great technical expertise in the computing field, but lacked formal education in the management techniques as well as close scrutiny from the organization as any other functional area is required to have. [Ref. 23: p. 58]

The best known model of evolution related to information systems is the "stage" model developed by Richard Nolan. This model, which first appeared in print in 1973, has been cited extensively as the major statement about the growth of information systems in organizations. From its beginnings as a tentative hypothesis [Ref. 25: p. 402], the model had become regarded as empirically grounded theory by 1979 [Ref. 26: p. 115], and an accepted description of how changes in organizational information systems take place over time [Ref. 27: p. 48]. Figure 4.1 provides an example.

Not all authors agree with Nolan's models though:

> The Nolan model has had a powerful influence on the information systems field. Its popularity is probably due to its bold approach to dealing with a phenomenon of great complexity in a straight-forward and clever manner. Nolan was the first researcher to introduce a structured scheme for explaining the growth of computing in organizations. Aspects of the model ring true



[Ref. 28: p. 81]

Figure 4.1 Six Stages of Growth in Data Processing, Identified by Nolan.

to practitioners and researchers alike. But it is incomplete in its attempt to capture the larger organizational context within which computing occurs, and it

is not accurate in the accounting of the relationships between the various components in this context. [Ref. 30: p. 474]

A large portion of the state of the art organizations are in the latter portions of stage 4 or the beginning of stage 5, where Information Resource Management is emphasized. Closer scrutiny of the model, reveals that the United States Navy as a whole, might be located in the latter portions of stage 2 or the early stages of stage 3 [Ref. 31: p. 1]. Possible reasons for this disparity were covered in Chapter II of this thesis. Assuming that it is necessary for an organization to pass through the Nolan stages, though a minimum or maximum time limit for traversal is not implied, it becomes the authors' opinion that the U.S. Navy being in the lower stages of Nolan's model might be considered as a blessing. The reasoning behind this statement, is that the implementers of new information systems (IS) within the U.S. Navy can learn from the mistakes of past implementations of information systems. With these "lessons" in mind, the Navy can use accepted and proven methodologies to possibly pass through stages 3 through 5 with minimal time and impediment to the organization. Enroute, the Navy will become the beneficiaries of mature systems that have become a part of the overall structure of the organization as the IS strives to serve the needs of the users.

In the earlier years of data processing, originally an organization sent its requests along with the information required, to the data processing center. It was massaged, lines of code produced, and the result was sent back to the user. With technological advances came wider uses and demand of data in the form of useful information which ushered in the MIS era. Presently, the office automation venues, local area networks and increased data processing

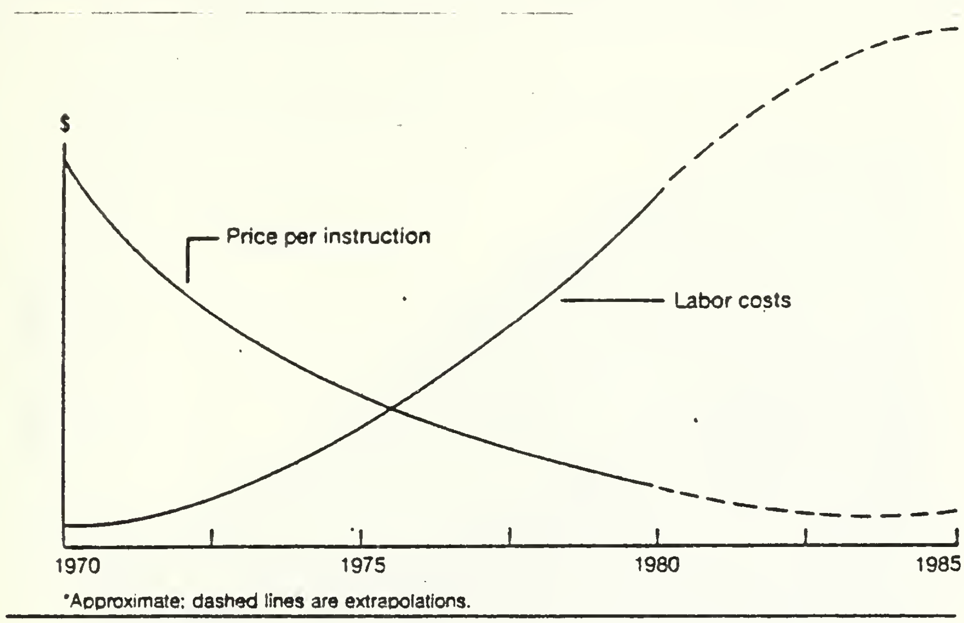
capabilities, has given rise to the microcomputer, which has placed great potential information power in the hands of expectant users. This has ushered in a new concept termed Information Resource Management (IRM), that has promised important implications for its DP and MIS predecessors. [Ref. 32: p. 94]

B. WHY INFORMATION RESOURCE MANAGEMENT?

> Today, many corporations and institutions are quite satisfied with their data processing capabilities and so they should be; through much hard work these data processing capabilities have become very effective. Nevertheless, the trap to which many executives in these companies may fall victim is the belief that information needs and requirements for information management during the 1980's can be satisfied by the principles and techniques that are proving successful today. It is assumed that the agent that will allow current directions to be maintained is technology itself, cheap minicomputers and new communications potential. But technology itself is not the total answer for the future. [Ref. 1: p. 50]

Computing power is becoming relatively cheaper as labor costs rise (see Figure 4.2), providing some impetus to computerization. [Ref. 18: p. 10]. So the question becomes, how does the organization manage this vast cauldron of information that is available to the manager, if the manager assumes that the organization will have fewer personnel in which to use on any specific problem? For FY 85, 28 percent of the DOD budget will be utilized in the payment of personnel costs [Ref. 33: p. 578]. Granted, a certain percentage of that slice was payment to retirees, but the connotation is clear that commanding officers can no longer approach problem solutions using the old axioms of putting more people on the job to ensure the successful completion of the project--the people just aren't available [Ref. 31: p. 2].

But, further examination of the term "computing power" is warranted. The authors feel that when most references

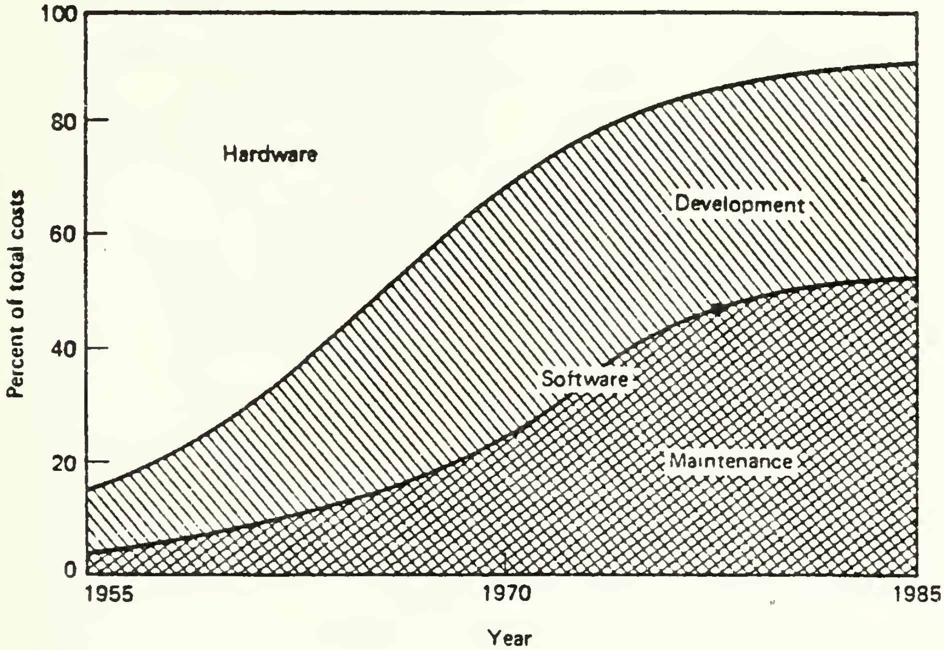


[Ref. 18: p. 10]

Figure 4.2 Labor and Computing Costs.

use the terms "computer costs", "computer power", etc., the publications are only referring to the hardware costs. Granted, hardware costs have decreased dramatically over the last two decades, but the systems or lifecycle costs have increased at an inverse proportion to the hardware costs. Software and software maintenance costs have reached dramatic proportions and the production backlog in these areas are estimated at a 2-5 years delay [Ref. 34: p. 88]. Barry Boehm claims that in 1955 computer hardware costs dominated software costs 7:1, but by 1985 software costs are expected to dominate hardware costs 9:1 [Ref. 35: p. 17]. Figure 4.3 refers.

> This is a dramatic reversal, with equally dramatic effects on perceptions about the costs of computing generally. Hardware is usually acquired before



[Ref. 35: p. 18]

Figure 4.3 Hardware/Software Cost Trends.

> software, and so this shift has reduced the entry costs of computing. Start-up has become comparatively less costly than successfully implementing computer systems, that meet organizational needs. Computing now appears to many decision makers as inexpensive, but a closer look reveals that it is not so. [Ref. 7: pp. 329-330]

In 1979, The Diebold Group, Inc., coined the term Information Resource Management (IRM), as their view of how the corporate management of the future would handle information in more effective and efficient ways than organizations had done in the past [Ref. 23: p. 58]. The Group made the distinction that the inference was not in reference to data, but to information, which was considered the analysis and

synthesis of data [Ref. 1: p. 50]. The founder, John Diebold, based this concept on a passage written by Johann Wolfgang Von Goethe in 1810. "The modern age has a false sense of superiority because of the great mass of data at its disposal, but the valid criterion of distinction is rather the extent to which man knows how to form and master the material at his command " [Ref. 1: p. 51].

"The importance of information cannot be overstated," [Ref. 20: p. 78], states John J. Connell. He goes on to discuss how organizations are presently in an information age where the work force is increasingly made up of people who work with information. Workers are besieged on all sides by new information sources, while better information might provide the competitive edge that ensures the success of the organization. Information can be thought of as a resource, an asset, a commodity, a national treasure, power, money, and possibly knowledge [Ref. 36: p. 56]. It is all of the above. It is none of the above. The reader could also state that information is unique in that it has no value in itself. One can determine its value by those that use it and that value can vary over time. The same cannot be said of other corporate resources--the value of information is in the minds of its users [Ref. 37: p. 112]. But above all else, information must be managed if it is to prove its worth in the future. "It is clear that the organizations that will excel in the 80's will be those that recognize information as a major resource and structure it as efficiently as they do other assets " [Ref. 1: p. 51].

C. DEFINITIONS OF INFORMATION RESOURCE MANAGEMENT

Information Resource Management (IRM), has been defined in widely differing ways by different authorities. There is probably no definition on which all authorities would agree, due to its unique nature as well as newness on the scene.

Some definitions are as follows:

> IRM seeks to identify the common patterns of information that exist in the organization, to integrate these varied patterns across the total organization into a coherent whole, and to provide guidance in the form of standards and conventions to make the best use of information owned by the organization. [Ref. 38: p. 46]

> IRM ...is expected to include the data processing, word processing, data and voice communication, mail and other related administrative functions. [Ref. 23: p. 58]

> IRM has been defined as 'a state of mind,' an attitude that considers information as important as any other vital corporate resource. [Ref. 29: p. 72]

> The objective of information resource management (IRM) is not to manage knowledge, nor is it really to manage information-though that is what the phrase implies. IRM's objective is to manage, store, give access to, and provide the ability to manipulate and communicate the raw material of information and knowledge: data. [Ref. 39: p. 225]

> Information resource management is a management function to develop and implement policies, programs, guidelines to plan for, manage, and control information and information resources. [Ref. 40: p. 43]

> IRM is the discipline of comprehensively managing an enterprise's information requirements, using contemporary technology in the most profitable way. IRM has five distinct but interdependent management functions-human resources, planning, data, applications, and networks. [Ref. 41: p. 175]

IRM is simply the ability of management to come up with accurate information, at the right time and at the lowest cost. [Ref. 21: p. 15]

Managing the information resource essentially means gathering, storing and processing data so efficiently and effectively that organizations produce the best information with which to make decisions and take actions-both on operational and corporate levels. [Ref. 34: p. 88]

The Information Resources Management System can be viewed as a framework within which to accomplish the management of data resources in an orderly and systematic fashion. [Ref. 36: p. 99]

Information resource management, in our view, involves the integration of diverse disciplines, technologies, data bases, and other information handling resources. [Ref. 4: p. 8]

Information resource management is the process of managing information in an organization so as to maximize its goals. [Ref. 40: p. 43]

A (computer-based) system that processes data into a meaningful form that can be used by the recipient for decision-making purposes. [Ref. 42: p. 512]

Management of the integrated information resources of a corporation, including data processing, communications, and office automation. [Ref. 43: p. 530]

The policy, action, or procedure concerning information (both automated and nonautomated) that management establishes to serve the overall current and future needs of the organization. IRM policy and procedures would address such areas as availability, timeliness, accuracy, integrity, privacy, security, auditability, ownership, use, and cost-effectiveness of information. [Ref. 441: p. 2-1]

A divergence of opinion is apparent in these definitions. Some authorities say that Information Resource Management infers automation; others not; some insist that the management of the data is the key issue. Some say that the information, next to personnel, is the most important asset of the organization; others do not; others say that IRM is no more than a glorified extension of MIS and will probably go the same route as other information systems and fail to live up to its claim [Ref. 20: p. 84]. The authors feel that Information Resource Management is the first real concept that tries to encompass all of the organization's attributes in its planning. The organization uses these resources much like an investor uses an investment portfolio--putting his assets and time into those areas that will reap the organization the highest yields based on that organization's present situation and future strategy.

Top management must realize that the computer can help the organization put their arms around the domain or bounded area of the activity's area. The external forces and internal needs should drive the information system, not vice versa. If symbolic representations in the computer are not founded in organizational reality, the representations should probably not be there. Each piece of information that is stored and manipulated should serve some real organizational need. [Ref. 29: p. 73]

The definition that seems the closest to conveying the authors' opinion of IRM was formulated at a Workshop on Data Dictionary Systems and Information Resource Management

sponsered by the Association for Computing Machinery and the National Bureau of Standards in 1980. The definition reads:

> Information Resource Management is whatever policy, action, or procedure concerning information (both automated and nonautomated) which management establishes that serve the overall current and future needs of the enterprise. Such policies, etc., would include considerations of availability, timeliness, accuracy, integrity, privacy, security, auditability, ownership, use and cost effectiveness. [Ref. 45: p. 50]

This definition of IRM was said to have been chosen to emphasize the organization's wide nature of planning and execution of information policies, actions, and procedures in order that data can be treated as a true resource. The definition was also to reflect the primary shift of data processing uses from processing centered design methodologies to data centered methodologies [Ref. 46: p. 1-10], which is a key point, but will be left to further investigation by future writers. Additionally, one will observe that the DOD accepted version reads almost verbatim as this definition does and the proposed SECNAV instruction on IRM has adopted the DOD's terminology [Ref. 47: p. 1, Encl 2].

D. A CONCEPTUAL VIEW OF IRM

A modern organization possesses a tremendous amount of valuable data that has been generated, collected, and stored in an automatic and somewhat formatted state as well as manual files. However, the real information content of an enterprise consists of both unformatted data and information, as well as both manual and automated processes. Data can be classified into four distinct classes:

1. Formatted and machine readable.
2. Formatted but not machine readable.
3. Unformatted but machine readable.

4. Unformatted and not machine readable. [Ref. 46: p. 1-8]

The processes required to utilize the data of any of the above classes include:

1. Collection- This process generally tends to be expensive as the cost of identification and recording can be high. [Ref. 18: p. 73]
2. Processing- The data collected is generally massaged in some fashion before and/or after being stored. In the case of automated data, this could occur through the use of computer programs while for nonautomated data, manual processes are used. [Ref. 36: p. 102]
3. Storage- The repository of data and information may be termed as a database, whether it is a filing cabinet, a library of books or documents, a set of computer tapes, or online storage. Generally, unless it is a database consisting of stacks of letters and magazines on an officer's desk, there is some organization to this database. There is a storage method (such as a catalog or filing system) generating an index for its retrieval, or perhaps a method of sorting the database in some predefined order. A distinction should be made between storage of current data and archival storage. [Ref. 18: p. 56]
4. Retrieval- The retrieval process normally uses some knowledge about the storage technique being used (such as what the index, catalog, or ordering is) to make sure the time and cost to retrieve it more effective, if not efficient. Often there exists some kind of query interface that a user may invoke to aid in the retrieval. [Ref. 48: pp. 60-61]
5. Communications- Many times a communications medium must be invoked if the requester for data is at some

site remote from the database or if the database is distributed. The communications system may consist of messenger services, mail services, telephone or other automated systems, some of which may involve microwave and satellite links. [Ref. 22: pp. 96-101]

The environment in which the preceding processes take place is composed of:

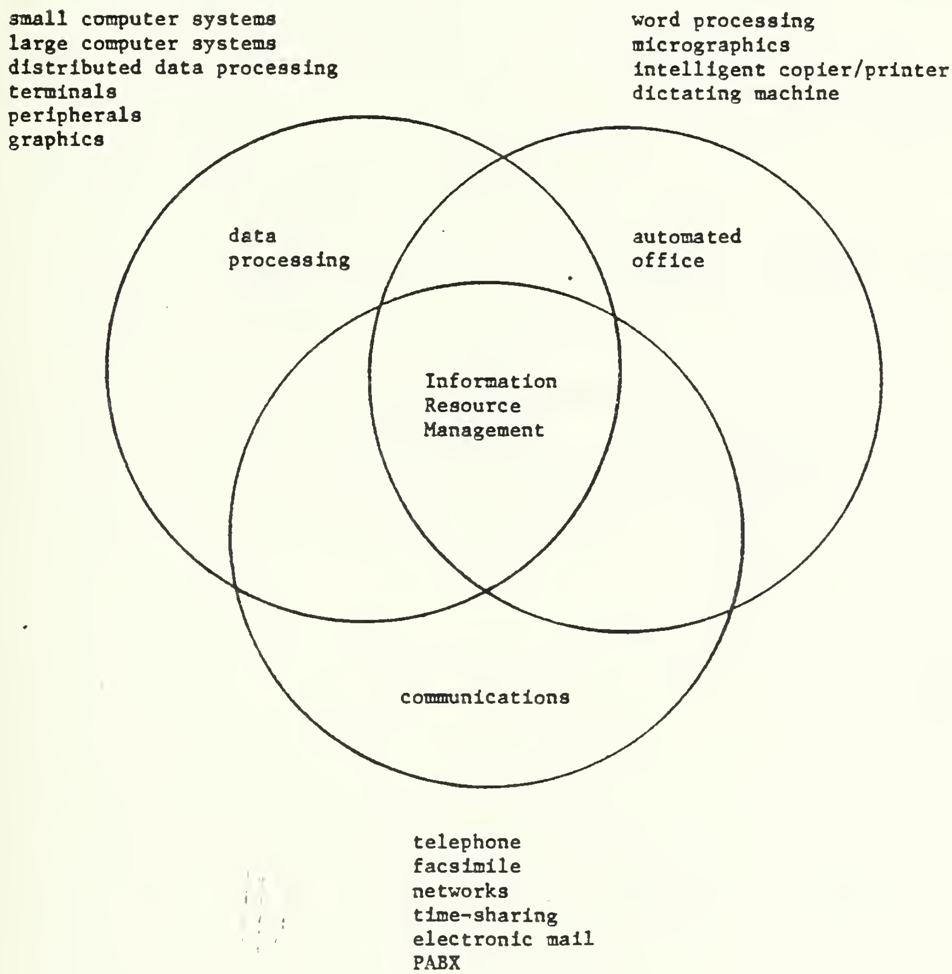
1. Data and Information- This has been discussed previously, and represents the heart of the entire spectrum of information processing activities.
2. The Users in the Organization- Here the authors are referring to the personnel in the organization who are users of data and other information components in the pursuit of the activities that represent the purpose of the organization. It can be expected that this will include the vast majority of the people working for the organization. [Ref. 4: pp. 95-99]
3. Physical Facilities- This is an extremely broad range of entities composed of computer hardware, but also includes microfilm cameras and readers, xerographic copiers, word processing systems, visual and audio devices, etc., as well as manual files, typewriters, etc. [Ref. 18: pp. 496-497]
4. Processing Facilities- The use of these are required in the processing activity described above, but is not limited to it. These are all the activities that take place in the use of physical facilities, i.e., what is usually called software and manual processes. Software should be differentiated between vendor supplied and produced in house, which may include software produced with the help of contractual services or automated tools. [Ref. 48: pp. 89-92]

5. Support facilities- In this category, the authors include all the services which are required by users of data as well as personnel whose responsibilities are primarily in the information systems area. Included are research librarians, local computer systems staff advisors and system designers, etc. [Ref. 36: pp. 56-58]

Each component listed is referred to as an Information Resource, and then Information Resource Management (IRM) becomes the task of managing these resources in an integrated and coordinated manner. The field of IRM thus contains all management aspects (policy formulation, resource allocation, implementation, and control) of the entire information related operations of the organization. The many locations in which an organization has previously stored its database merely adds to a confusing situation which has grown from a lack of ability to truly manage the information, as it was too dispersed and to difficult to control in any centralized fashion. [Ref. 46: p. 1-10] The relatively recent realization that modern computing systems can and probably should be used to control the entire information resources of the enterprise has culminated in such disciplines such as Database Management System (DBMS), Spatial Data Management System (SDMS), the Data Dictionary System (DDS), Decision Support Systems (DSS), and Information Resource Dictionary Systems (IRDS), to name a few, as well as planned extensions to allow better planning and control of the entire information resource.

All the foregoing considerations emphasize the growing awareness that information is a vital organization resource and that, as such, it must be managed as skillfully as any other important resource. The importance of managing information gathering and processing, was recognized by the

Association of Systems Management (ASM), which adopted a program, called "Project 80's." This project identified four general classes of information technology: data, text, voice, and image, which would possibly require management by



[Ref. 43: p. 18]

Figure 4.4 Convergence of Information Technologies.

systems professionals. Figure 4.4 illustrates how the data processing, automated office, and communications disciplines are merging and creating an overall Information Resource Management need. [Ref. 43: p. 19]

As noted in Nolan's model earlier, as organizations approach the maturation stage, the contention for information resources increases and productivity is emphasized [Ref. 34: p. 120]. The major tasks of the IS centers will not be the design of more effective computers or computer programs. Rather, it will be to improve:

1. The quality of information services as perceived by the users of such services.
2. The productivity of the end users.
3. The management of data processing systems and applications efforts. [Ref. 43: p. 22]

Information Resource Management seems, in the opinion of the authors, to be the discipline, methodology, or thought process that will attempt to provide these answers.

V. DEFINING IRM FOR NAVAL SHORE ACTIVITIES

A. WHY IRM FOR THE SHORE ACTIVITY?

Up until this point, the authors have presented possible reasons why IRM is in vogue today. From IS history to a displaying of the problems confronting the commanding officer of a shore command today, the purpose was to provide reasons and insight to the concept of IRM. Now the authors will explore how Information Resource Management fits into the schema of the Naval Shore Activity and in what areas it might "lighten the load" of the commanding officer and the principal department heads.

But, caution must be observed here. If the reader expects to find a neat, clean-cut, twenty-five words or less definition of IRM at the activity level, they will probably be very disappointed. The authors feel that IRM is a series of processes initiated by the activity for the purpose of utilizing information as a resource that benefits the command. This goes against the grain of traditional thought that structures most concepts to the point that their flexibility and creativity are normalized to a position where they might not be useful, viable tools for the decision maker. This innate vision of the organization, cannot be boxed, crated, or priced, but rather requires <u>years</u> of commitment at all levels of the command, until the conceptual framework of IRM becomes the mature, infrastructure that it purports to be.

B. WHICH INTERPRETATION OF IRM?

One of the immediate problems is to decide on an interpretation of IRM that will produce the desired results.

Because it is a relatively new field, there is not a commonly agreed upon set of terms or definition of scope for Information Resource Management. This was pointed out quite clearly in Chapter IV. Presently, there are two somewhat diverse interpretations of what IRM encompasses. One interpretation holds that IRM is the management of all of the resources of an enterprise which are devoted to handling information. In this regard, the reader could view IRM as incorporating the management of ADP and word processing equipment, telecommunications, IS design and development, software production and maintenance, technical libraries, document retrieval systems, and much, much more. This view would focus on the people, equipment, and procedures necessary to provide information to decision makers in the organization. [Ref. 49: p. 3]

The authors would contend that the structured and centralized nature of the Navy results in the above interpretation being held by the commanding officers of most shore activities. Additionally, this thought process is easily portrayed graphically, as well as being readily communicated to the organization. But the authors believe this view is not the correct way that IRM should be looked upon by the shore activity.

The second interpretation, and the one that the authors subscribe to in this thesis, holds that information is a basic resource of an organization--a resource that must be managed. Information Resource Management, in this interpretation, <u>is the management of information as a resource and not the management of the resource involved in handling or producing information</u>. From this perspective, IRM encompasses the management of the names, attributes, values, and other representational characteristics of the information which the organization collects, transmits, processes, stores, or distributes. The management of the information

resource, naturally, will entail interaction and cooperation with the management of the information handling resources, but Information Resource Management entails a unique set of problems and provides a command-wide perspective of the information resource regardless of the storage media of the data or the system of its application. [Ref. 49: p. 3]

C. DEFINING THE PROBLEM

> Virtually every action by a commander, manager, or administrator in the Navy, as in any large organization, involves the acquisition and understanding of information: information about the organization, about its status, about its resources, about its environment. His actions usually result in the creation and promulgation of policies and directives: that is, information for subordinates, peers, or superiors. [Ref. 2: p. 2]

This quote was taken from a July, 1983, report to the United States Navy by a Committee to review the Navy's long-range ADP planning. The report went on to say that automated handling of information is a means for facilitating the whole IRM process: for carrying out simple functions and for keeping, transferring, and displaying in clear form information to be used by people; people who may be workers, managers, or both. [Ref. 2: p. 2]

Managing information as a resource would appear to be a concept that would appeal to the commanding officers of most naval activities. Information can now be understood as a resource which can be managed by the commanding officer in ways similar to the manner in which personnel, money, facilities, and supply inventory resources are presently managed. Although this concept would probably elicit a favorable response from the commanding officer and the principal department heads, the question then becomes what is the procedure(s) for managing this resource? This question should be asked carefully, because the process of resource

management may not be as well documented or understood as it is practiced. Many commanding officers are effective in managing a number of resources, given the goal of accomplishing a particular task or mission. The commanding officer's experience, coupled with intuitive leadership and managerial skills, enables the commanding officer to carry out the task. However, asking these same professionals how they might manage any one specific resource may result in a not so clear-cut response. [Ref. 50: p. 41] Because of this, suggesting that information should be managed as a resource will not invoke the actioned response that equates to the conceptual connotation that was discussed previously in this chapter.

The relative unit cost of processing an item of information, whether in collection, storage, computational, distributive, processing or dissemination modes, appears to be dropping significantly [Ref. 17: p. 8]. This was discussed earlier, but what must be cautioned here, is that the commanding officer's attention may be diverted to the tool--the new equipment--rather than an objective and substantive review of the information requirements which supposedly justify the investments involved [Ref. 51: p. 25]. The authors discussed this point with a civilian member of a naval station staff, who was hired by the commanding officer to "update" the processing services at his command. The CO's direction to the system's analyst consisted entirely of the statement, "Bring us out of the dark ages," with little other specific direction as to what the final system should look like or encompass! Such a statement will probably result in a proliferation of very useful tools and ideas, but overall may not necessarily be synchronized and harmonized within the organization's mission, policies, and operating frameworks [Ref. 17: p. 8]. Thus, the management of information as a resource should

focus on the management of information regardless of its storage medium, irrespective of the equipment (data processing, office automation, data communications, etc.) which handles it, and looks both horizontally and vertically across systems, uses, organizational boundaries, and functional areas [Ref. 31: p. 2].

Webster's New World Dictionary provides the following three definitions:

1. Information-knowledge acquired in any manner; facts; data; learning; lore.
2. Resource-something that lies ready for use or that can be drawn upon for aid or to take care of a need.
3. Management-the act, art or manner of managing, or handling, controlling, directing, etc. [Ref. 52: pp. 723, 1211, 859]

These definitions seem neat and tidy, but to the commanding officer who is attempting to implement IRM, they become anything but "user friendly." But this should not be so. Managing data and information resources certainly isn't some startling new breakthrough or patentable invention that the world has been holding its breath in anticipation of receiving. Rather, it should be emphasized that IRM is simply an updating and integration of related information management principles currently dispersed and diffused among many different disciplines and bodies of knowledge [Ref. 17: p.8]. While IRM makes the case that data and information resources have been under-managed and under-utilized, <u>it would be a mistake to adopt the view that IRM will solve all of the commanding officer's resource management and utilization problems</u> [Ref. 20: p. 84]. Rather, it should be viewed as one of many tools that should ease the burden or increase the efficiencies of the decision making process.

D. VIEWS OF INFORMATION

1. Broad Views of Information

The authors brought forth two broad views of the way information should be viewed by the commanding officer of a shore activity in Chapter III. One was an external view of that information which the commanding officer utilized to satisfy the demands/reports of the administrative chain of command. The other informational view, consisted of those data inferences that were required in the day-to-day operation of the activity. But, both of these views are not specific enough to the discussion of information, to bring to proper view what information as a resource should appear as to the commanding officer. Something more is required.

One of the most significant management problems to be faced in the management of information will be the determination of the cost of information within an organization and the benefit that is received by introducing a wide variety of information handling techniques. Daniel Schneider, a speaker at the INFOSYSTEMS IRM conference in 1980, suggested that the value added concept of information can be understood by categorizing information into different categories:

1. Information for operation,
2. Information which enhances operation, and
3. Information for decision making [Ref. 50: p. 42].

To encompass the points given, the authors contend that the commanding officer must begin thinking of data, not just as abstractions --ideas--but as something tangible, physical, and concrete. Granted, information could be thought of in two ways: as abstractions (ideas) and as a physical commodity. But in the end, the commanding officer must consider both ways of looking at information if the shore

activity is to manage the information effectively. This will require a fundamental rethinking of traditional ways of looking at information.

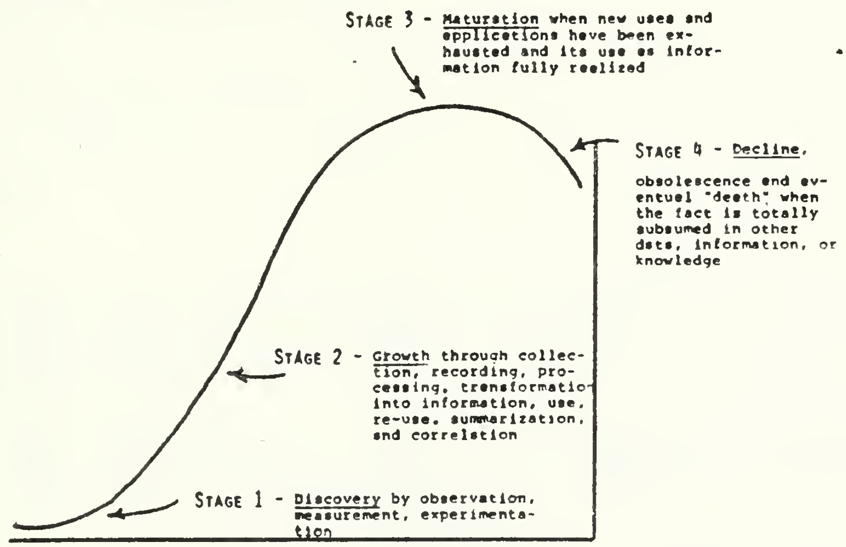
James Martin further identifies these same three categories as types of management, i.e., operating management, innovative management, and top management [Ref. 28: p. 173]. While the first and last are easily identifiable at the shore activity, the innovative management idea does not lend itself as well. The authors would prefer that the term "planning" be substituted for the term "innovative." Each of the three managements have different information needs:

1. Operating Management Information Needs - Existing procedures in the organization are primarily those which have been established by directives from higher authority, as well as command and departmental instruction, that enables them to carry out their day-to-day activities and responsibilities. Reporting procedures provide the data and information necessary for routine decision making by operating management.
2. Planning Management Information Needs - While operating management is concerned with today, planning management is concerned with tomorrow: the priorities, services and activities which the organization will address in the future. The information required by planning management is forward-looking, rather than the typical backward looking or current information required by operating management.
3. Top Management Information Needs - Top management requires information both for today and for tomorrow. The organizational leaders require information about today's activities (from operating management). But top management also requires information which will

enable them to establish the direction of the future. Planning management normally provides this latter input to top management. [Ref. 28: p. 173]

2. The Lifecycle of Information

Essential in the implementation of Information Resource Management, is a clear understanding of the relationships between knowledge, information, and data. A



[Ref. 36: p. 54]

Figure 5.1 Life Cycle of a Fact.

simple schematic, as shown in Figure 5.1, can perhaps most easily be understood as depicting the "life cycle of a fact." Thus, in the first stage of its life cycle, a fact is "born" or emerges. At this stage, it is a raw fact -- unevaluated. It has almost no significance standing alone

out of context. As the fact "grows," it enters the second stage of its life cycle. Someone has chosen to evaluate the significance of the fact, to place some interpretation and meaning on it. Thus information is sometimes referred to as evaluated data. Finally, in the third stage, the maturation stage, various bits and pieces of information are put together in an even broader context. Knowledge then will aid the user to move from the mere option or half-truth to "truth." Eventually, the fact "dies" or its identity and relevance are completely subsumed and submerged in the knowledge base. [Ref. 36: p. 53]

3. <u>What Is Information</u>?

Forest W. Horton, Jr., has compiled many theorists' ideas in addition to his own, in how one might view information.

1. All acquired facts were at one time information, beginning with the early prenatal and postnatal processes of sentience, cognition, recognition, and perception.
2. Knowledge is an organized body of information, or the comprehension and understanding consequent to the acquisition thereof. Information is therefore the narrower term of the two.
3. Two or more facts may be correlated by the intellect to produce information. Both facts may already be in memory, or one may be in memory and the other in the process of being brought into memory.
4. Semantically and epistemologically, insofar as this hypothesis is concerned, because of some dialectic such as induction or deduction.
5. The value of information is the extent to which it helps to resolve uncertainty. The value of information is zero if uncertainty is not resolved to any degree; "complete" if uncertainty is completely resolved.
6. In this theoretical framework, the burden imposed on those persons who furnish information might be defined, measured, or weighed against the value of the information furnished in psychological value/burden terms only, not in economic terms.

7. One man's data may be another man's information and vice versa.

8. Typically, as we go up the organizational/authority ladder, information at the lower level becomes data at the upper level. Part of the reason is summarization and aggregation of data to correspond to broader responsibilities. Part of the reason goes to interpretation differences, because significance and relevance are, in part, circumstantial and contextually-dependent, not rooted in absolute or immutable conditions or situations. [Ref. 36: p. 55]

A popular distinction among current writers restricts the label of information to evaluated data [Ref. 31: p. 2-1]. Other authors feel that it is not so much a problem of data acquisition as of data organization; not so much of organization as of retrieval; not so much of retrieval as of proper choice; not so much of proper choice as of identification of wants; not so much of identification of wants as of identification of needs. The problem then in information management, is not one of gathering, organizing, storing, or retrieving data, but rather one of determining the necessary information requirements for decision making. [Ref. 22: p. 194]

Information is simply symbols (data, text, images, voice, etc.) that convey meaning through their relative ordering, timing, shape, context, etc. It includes all of the traditional output associated with computerized information systems such as computer printouts, display screens, microfiche and data bases. It also includes memos (word processed or not), conversations (hallway or coast-to-coast), drawings (scribbled or draftsperson drawn) and body language. Information is the raw material for making decisions, for creating knowledge and for freeing the modern organization. [Ref. 38: p. 43]

The views of information are limitless and complex. But out of possible chaos comes order, as the authors will try to convey in the next few sections of this chapter.

E. STAGES OF IRM

As the authors have presented in previous chapters, Richard Nolan has benefited the information systems community through his studies and writings in the *Harvard Business Review* about his proposed stage theories of evolution of information systems organizations. The stage theory concept is now being applied widely in many areas of the technological explosion [Ref. 30: p. 466]. The authors feel that it would be equally appropriate to apply the stage theory to understanding the evolution of IRM within a particular activity or organization. The stage theory would indicate that organizations will go through four significant stages of IRM evolution:

1. Initiation,
2. Contagion and proliferation,
3. Consolidation and control, and
4. Experienced maturity [Ref. 50: pp. 47-48].

A key factor of understanding the stage theory is that the organization will learn only through experience in the use of a new concept. It will be necessary for the organization to move step-by-step along the learning curve through the various different stages. [Ref. 53: p.88] An IRM program must keep pace in concept with the learning stage the organization has achieved in computer growth [Ref. 50: p. 48]. As the authors pointed out in earlier chapters, the possibility that the U.S. Navy is presently in stage 2 or 3 of Nolan's 6 stages (see Figure 4.1) of computer growth within an organization, probably works in favor of the command that is trying to implement IRM along with automated facilities. Remembering that IRM is a series of processes or a vision of how information should be dealt with within the organization, will allow the activity to reach

maturation goals in both computer usage and the IRM infrastructure simultaneously. The inherent advantages of this approach is obvious in that neither the usage of computers nor the thought process of IRM are considered as "add-on", but rather both have become viable, integrated parts of the activity as both have grown and matured side by side in the organization.

It is not possible for an organization to jump along the learning stage diagram, bypassing important learning experiences [Ref. 50: p. 48]. To do so, would be to invite disaster in the form of the system becoming a detriment to the functioning of the organization rather than an effective aid to information management. It can be possible however, for the organization to move rapidly along the learning curve and to move without as much stress and strain as might otherwise be incurred, if an appropriately structured IRM program did not exist. Information Resource Management advocates, department heads, and the commanding officer, will probably change their views of IRM at different times along the learning curve. Advocates will learn faster and they must have patience until the rest of the organization moves effectively along the curve. This may mean that equipment proliferation and the use of diverse technologies may be necessary prerequisites to the introduction of control procedures, that will introduce into the organization an effective Information Resource Management program. [Ref. 4: pp: 7-14]

F. METHODOLOGY FOR IMPLEMENTION OF IRM

To this point, the authors have presented various arguments for why a shore activity should attempt to implement IRM. The obstacles that would interfere with such an implementation seems endless; the task itself formidable. Many

opponents to such an implementation might offer the argument that the present way of doing business at the shore activity seems to work well enough. The authors would counter with the following excerpt from the Mission Elements Needs Statement (MENS) submitted by the Commanding Officer, Naval Station, Norfolk. This MEN's stated that maintaining the status quo and failing to incorporate modern technology will only:

1. Promote and perpetuate obsolete manual methods of processing management information.
2. Delay important decisions for want of current data and a ready retrieval of pertinent data.
3. Use up personnel resources to maintain manual processes which are inefficient.
4. The effective management of resources will continue to be impaired.
5. Reduce the prime management functions of planning and training to subordinate priorities.

[Ref. 3: p. 4]

This seems all well and good, but how does the commanding officer implement an IRM infrastructure as described so far at the activity? The authors propose to give a brief introduction to a methodology in this section, with a more detailed, step by step, "cookbook" approach to be provided in Chapter VII. The "cookbook" approach will be structured so that it can be utilized by the shore activity's commanding officer and his subordinates. The authors will utilize the book Information Engineering by James Martin and Clive Finkelstein as the methodology and the "Bases and Stations Architecture", as briefed to OP-094 in mid-1984, as examples in formalizing an approach to IRM implemention for a shore activity.

G. BASES AND STATIONS ARCHITECTURE

In April 1984, OP-0945 commenced formal procedures to implement a systems architecture at selected Naval Stations and Bases, both CONUS and abroad. The authors met with Captain K. Laughton, USN, initial project manager of the proposed architecture, in mid-May 1984. The various approaches and methodologies were discussed that were being considered in implementing an IS architecture to be utilized by the activity's commanding officers and subordinates.

Since the Bases and Station's Architecture is projected to have a major impact on the shore activity, it is vital that the reader have an overview of the Architecture's history and direction. The proposed architecture will be a process, not necessarily a structured approach. Along that line, the core group, see Table III for the make-up of the group, determined various measures of effectiveness (MOE's) for the architecture, as well as making various recommendations of how to accomplish the process based on the present picture of things and the requirements as addressed by various commanding officers of shore activities. Included in this proposal was "bounding" the project to include 102 bases/stations total, identifying the functional areas at each activity to be implemented that would be included in the architecture (from a previous list of 55), proposing the implementation of 8 packages per year with the completion of the project projected for 1990, and determining 3 prototype activities (Naval Stations in Norfolk, Mayport, and San Diego were selected with three Naval Air Stations at the time of this writing yet to be decided upon).

To aid activities in the interim, until the projects were fully implemented, standard buy, stand alone, microcomputer systems (Zenith 100's) were recommended for use by all activities. These systems were considered to be adequate

TABLE III

Bases and Stations Architecture Core Group

Chairman:	Capt Richardson, OP-0945
NAVDAC Tech Dir:	Mr. Singleton, OP-094
CINCPACFLT:	Capt McMillian (ADP advisor)
CINCLANTFLT:	Capt Ramsey (ADP advisor)
NAVSTA Norfolk:	Capt Moore
Project Manager:	Capt Laughton, OP-0945

A number of additional people were invited for various portions of the discussion.

[Ref. 54]

for most activities and could be purchased using O&M, N funds. Additionally, NAVDAC has implemented steps to ensure that the nine NARDAC's break away from the "mainframe" mentality and try to size hardware to software requirements, in support of naval activity commanding officers. [Ref. 54]

In mid-July 1984, the Bases and Stations Architecture was briefed to OP-094, VADM Nagler. With few exceptions the project was approved as briefed, thus laying the ground rules for an architecture that is entirely "fleet" driven rather than the "top-down" approach as most projects are envisioned. The scope of the project covers the before mentioned 102 activities, plus 7 sponsors and 8 major claimants--a monumental task to say the least. [Ref. 11: unmarked] Figure 5.2 depicts a graphical representation of how the functional areas of the activity might interface with the commanding officer as well as the internal and external requirements that top management must deal with.

The term architecture in the computer industry, often implies a scheme which has not yet been fully implemented. A good architecture should relate primarily to the needs of

the end user rather than to the enthusiast for particular techniques. [Ref. 48: p. 413] Fred Brooks has defined architecture in a way which makes a clear distinction between architecture and engineering:

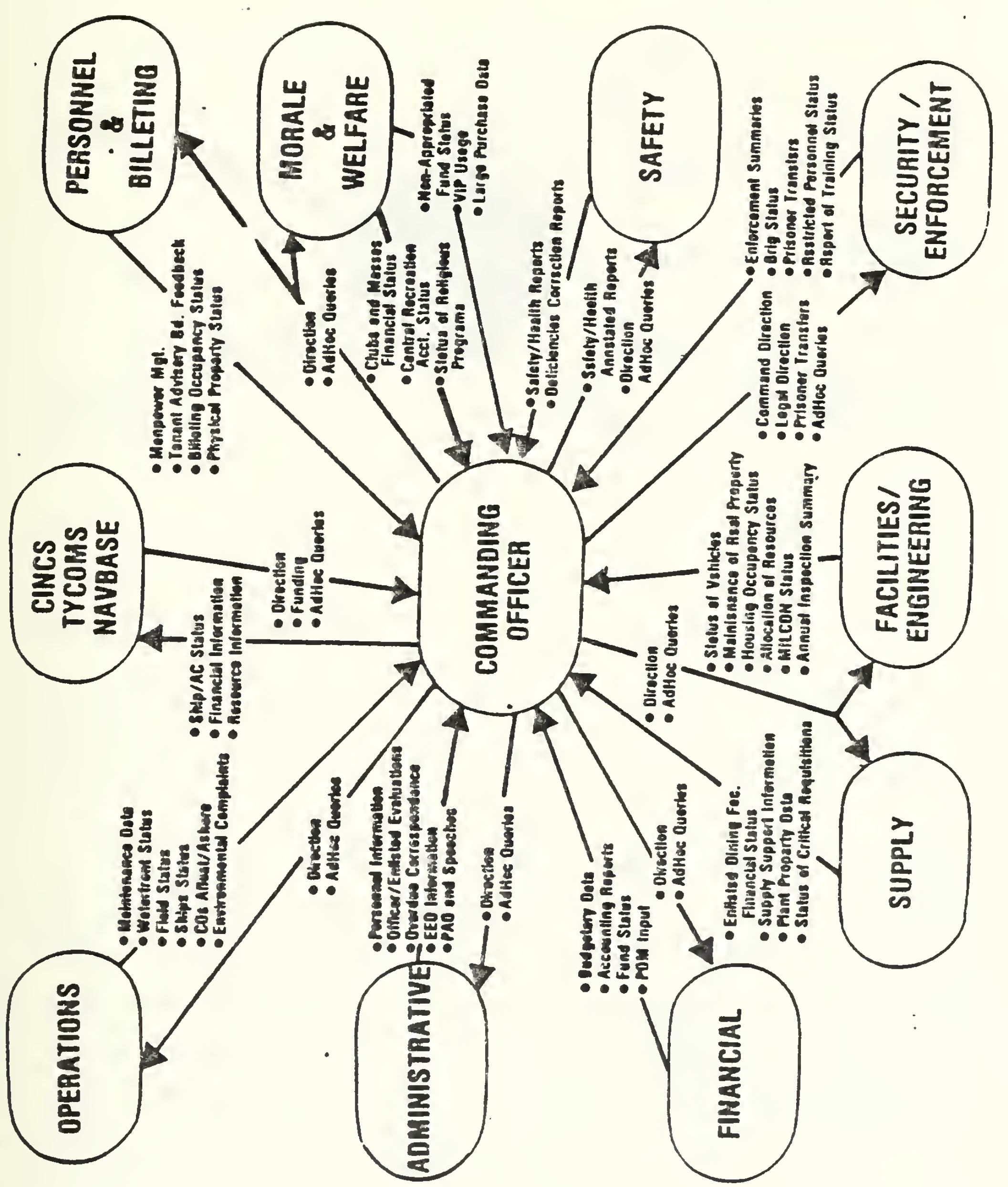
> Computer architecture, like other architecture, is the art of determining the needs of the user of a structure and then designing to meet those needs as effectively as possible within economic and technological constraints. Architecture must include engineering considerations, so that the design will be economical and feasible; but the emphasis in architecture is upon the needs of the user, whereas in engineering the emphasis is upon the needs of the fabricator. [Ref. 55: p. 45]

Additionally, architecture must be carefully distinguished from implementation. G.A. Blaauw states, "Where architecture tells _what_ happens, an implementation tells _how_ it is made to happen" [Ref. 56: p. 76]. Architecture, engineering, implementation; words that the commanding officer must understand if IRM is to aid the activity in their usage of information.

H. INFORMATION ENGINEERING: AN OVERVIEW

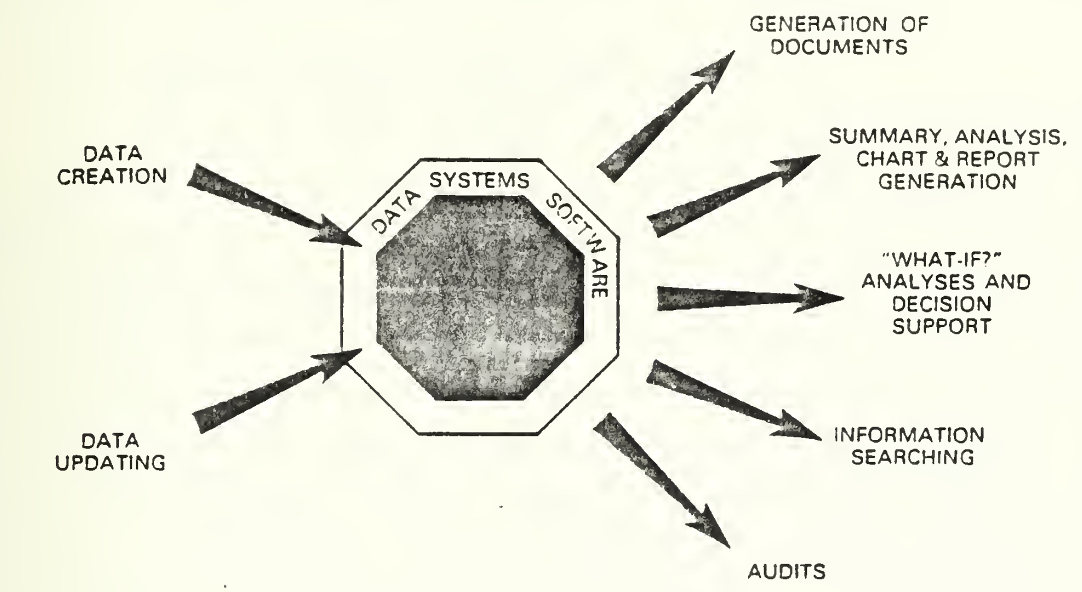
1. What is Information Engineering?

The term Information Engineering refers to the set of inter-related disciplines which are needed to build a computerized enterprise based on today's data systems. This is in contrast to Software Engineering which is the set of disciplines used only for specifying, designing and programming computer software. The primary focus of the Information Engineering methodology is the data that is stored and maintained by computers or the sources, and the information that is distilled from this data. A basic premise therefore (and one that must be understood by the reader or implementer of IRM) is that data lies at the center of modern data processing as shown in Figure 5.3.



[Ref. 11: unmarked]

Figure 5.2 Functional Area Interfaces with the CO.



[Ref. 28: p. 3]

Figure 5.3 Data at the Center of Data Processing.

The data is stored and maintained with the aid of various types of data systems software. The processes on the left create information with appropriate accuracy controls, and will be updated periodically. The processes on the right use the data. Routine documents such as 1149's, receipts, PMS results, etc., are printed upon demand. The commanding officer or principal department heads sometimes search for information as required. They create summaries or analyses of the data, and produce charts and reports. They ask "What if?" questions and use the data to help them make decisions. Auditors check the data and attempt to ensure that it is not misused. The data in Figure 5.3 may be in multiple data systems; the data may be stored in

different ways; it may be distributed; the data is often updated and used by means of transmissions links and terminals. [Ref. 57: pp. 3-4]

2. Data is Stable, Procedures are Not

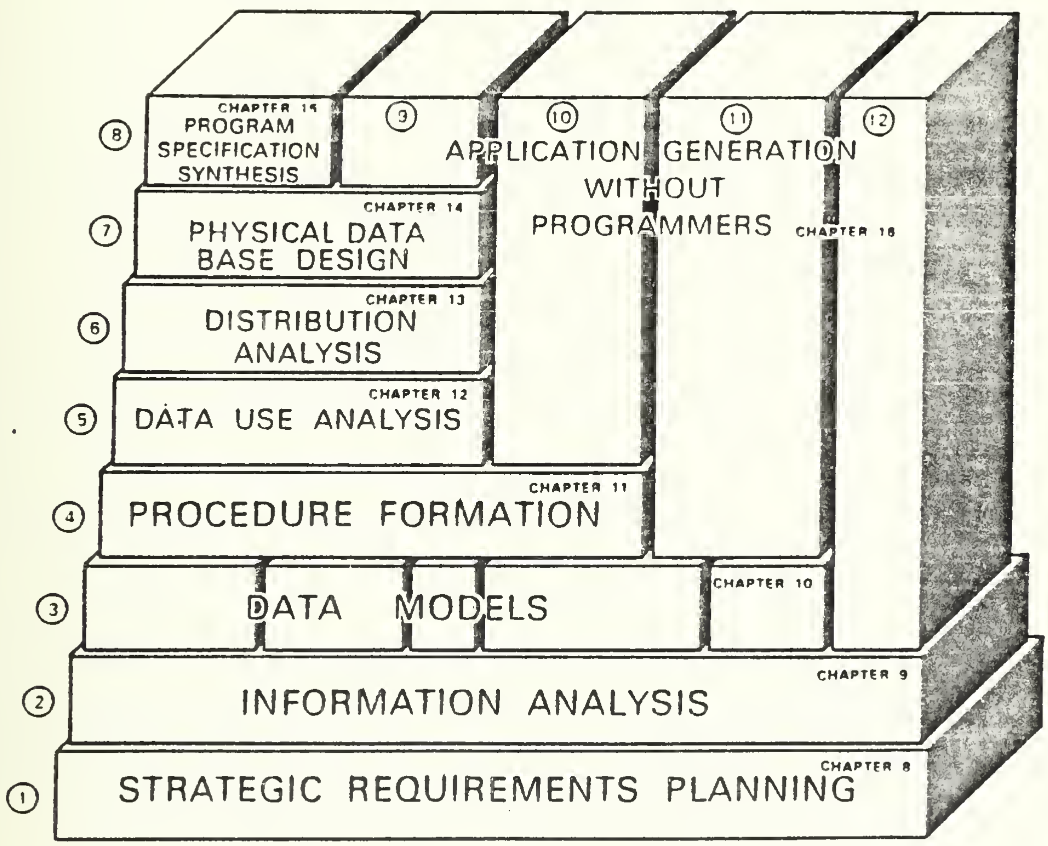
A second basic premise of Information Engineering is that the types of data used in an organization do not change very much. The things about which data is stored--for example, personnel, equipment, supply inventories, plant property-- do not change over the lifetime of the activity except for the occasional (rare!) addition of new types. The characteristics of these types of things--the fact that they have names, sizes, shapes, durations--also rarely change. However, the individual things--particular personnel or supply inventory--do change, so the values of the data kept change constantly like the data in a flight information board at an airport. The important point is that although values change, the structures of the data does not change much if it was initially well designed. This structure therefore could be used as the foundation for the organization's information systems. [Ref. 28: p. 4]

The foundation is secure only if the data is correctly identified and structured so that it can be used with the necessary flexibility. This is not a simple task and many of the early attempts to build organizational information systems failed. Some are now succeeding where appropriate methodologies are used. Because the basic data types are stable while procedures tend to change, data-oriented forms of structured techniques succeed, if correctly applied, where procedure-oriented techniques have resulted in systems which are slow to implement and difficult to change. Information Engineering seeks to fulfill, rapidly, the organizations changing needs for information. The organization can obtain results quickly once the

necessary data infrastructure is established. The activity can also have systems which are easy to change if the Information Engineering techniques have been followed. [Ref. 57: p. 4]

3. The Building Blocks of Information Engineering

Information Engineering, as shown in Figure 5.4,



[Ref. 28: p. 6]

Figure 5.4 The Basic Building Blocks.

provides in concept, an integrated set of building blocks. In this figure, each block is dependent upon the one beneath it. However, the blocks can be assembled in different ways depending on the techniques, tools, and style of the organization adapted by the activity in practice.

1. The stone on which all others rest is Strategic Requirements Planning. This attempts to determine the objectives of the organization and what information is needed to enable the activity to accomplish its objectives. The structure of Figure 5.4 can be built without Strategic Requirements Planning, but to do so would be like erecting a building on soft ground without good foundations.
2. The next stage or block is Information Analysis. This is top-down analysis of the types of data that must be kept and how the data might relate to each other. Information Analysis is done across the entire organization; sometimes this stage is done for one functional area, department, division or some other portion of the activity.
3. The third stage is Data Modeling. Information analysis surveys the types of data needed across the organization. It creates an information model which is a broad overview but which does not contain all the details needed for database implementation. Data modeling creates the detailed logical database design and attempts to make it as stable as possible before it is implemented. Stage 3 is an extension of stage 2 which carries it into more detail and applies various checks for stability. [Ref. 28: p. 5]

Data modeling is sometimes done without organizational wide data analysis. Localized models are built which relate to the particular division or department. Localized

models are easier to create and use, because arguments may be avoided among the various departments or divisions (functional areas). An objective of Information Engineering, however, is to achieve agreement on data definitions and structures across an organization, at least where that data has to be shared (to reduce data redundancy) or used in an overall control system. [Ref. 57: p. 6]

Information analysis cannot be achieved without senior management support, and that is often lacking. However, to build and implement a fully integrated IRM infrastructure within the organization, it is vital to harness the perspectives of top management and put the bottom two blocks of Figure 5.4 in place. [Ref. 28: p. 7] The techniques of Information Engineering give top management a plan of action with which to direct the development of information resources [Ref. 57: p. 6].

The bottom three blocks of Figure 5.4 form a foundation on which most future data processing will be built. Once it, or part of it, exists it may become desirable that computer procedures be developed to create and use the data. [Ref. 57: p. 7] Note, that up to this point, no mention has been made about automated systems whatsoever--the inference is clear: <u>define your objectives and what business you are about with clear definitions of the data and information required at all levels within the organization, prior to even considering what sort of computer or automated equipment will best serve the organization</u>.

I. IRM REVISITED

IRM is a management function. As such, IRM is a part of the organization's processes, like supply, administration, or port services. It is a function requiring management at a significant level. The purpose of this management

function is to develop and implement policies, programs, and guidelines. These are rather typical functions for a management organization, but the key to all of this, is again, it does not say computerize. Rather, IRM as a management function, says that the activity shall develop and implement policies, programs, and guidelines, to plan, to manage, and control information and information resources.

The importance here is that the authors do not talk about the media--e.g., computer, or word processor, or library, or microfiche--nor do the authors talk about the use--that is, the level in the organization or focus of the system top to bottom, decision-making, or operations. Nor do the authors talk about the source, internal versus external. What the authors have tried to convey is the need for a functional area to be responsible for thinking about, for planning, for implementation of activities that will maximize the effective use of information in an organization. [Ref. 40: p. 42] Robert Soloman, the director of communications of Congressional Information Services, states, "Companies will turn the corner when they realize the lack of goals to support IRM is costly, time- consuming, and wasteful. Information can only be measured from the cost of not having it" [Ref. 58: p. 75].

This is a good point to end the overview of Information Engineering and IRM for the shore activity. The authors' purpose was to give the reader a general idea of what is involved in the thought process required in the implementation of an automated system for an activity. The reader should try and visualize the presented thought process as it relates to Figure 5.2 which showed the basic 17 functions of the shore activity and their generalized internal and external interfaces. Chapter VII will follow this thought process more closely and at a greater depth, while the

following section of this chapter, shows in general how the Supply function of an activity would be viewed, utilizing Information Engineering principles as a guide.

J. SUPPLY DEPARTMENT FUNCTIONAL AREA REVIEW

1. Introduction

The strategic requirements planning stage requires identification of the key information that is supplied by each functional area. This information is essential for the effective management of the activity and the accomplishment of the activity's mission.

The process for developing the key information in each area can be best illustrated by analyzing a functional area. The authors will discuss a supply department in order that the reader may visualize the process for developing the key information flows, the importance of this information to the strategic requirements planning stage, and the relationship to the information analysis stage.

The authors chose the supply department because of its importance to a commanding officer and because of the fact that it provides some degree of service to most departments or offices at a naval station. The Naval Regional Data Automation Center (NARDAC) Norfolk, analyzed the various functional areas at Naval Station Norfolk, Virginia, (NAVSTA NORVA), and documented the fact that the supply department interfaced with each of the other functional areas [Ref. 59: p. 135]. The importance of the supply department was demonstrated by the findings of the Bases and Stations Architecture review. A survey of all participating commanding officers ranked the supply function as the second most critical of the seventeen functional areas to be implemented in the future [Ref. 11: unmarked].

The authors recognized that every supply department will be tailored to support the specific mission of the parent activity and that a typical supply department does not exist. The authors' choice of NAVSTA NORVA's Supply Department as an example was based upon a number of factors. NAVSTA NORVA was chosen because it represents one of the Navy's major shore installations and because it was included in the original Bases and Stations surveys. Additionally, the NARDAC-NORFOLK report documented the operation of the supply department and the areas most likely to be candidates for automation. A final justification for considering NAVSTA NORVA's Supply Department is the fact that the Naval Automated Data Command (NAVDAC) reviewed and adapted NAVSTA NORVA's Mission Element Need Statement (MENS) as a model and designated NAVSTA NORVA as a prototype site for developing a "Naval Base Information System" [Ref. 11: unmarked].

2. The Supply Department

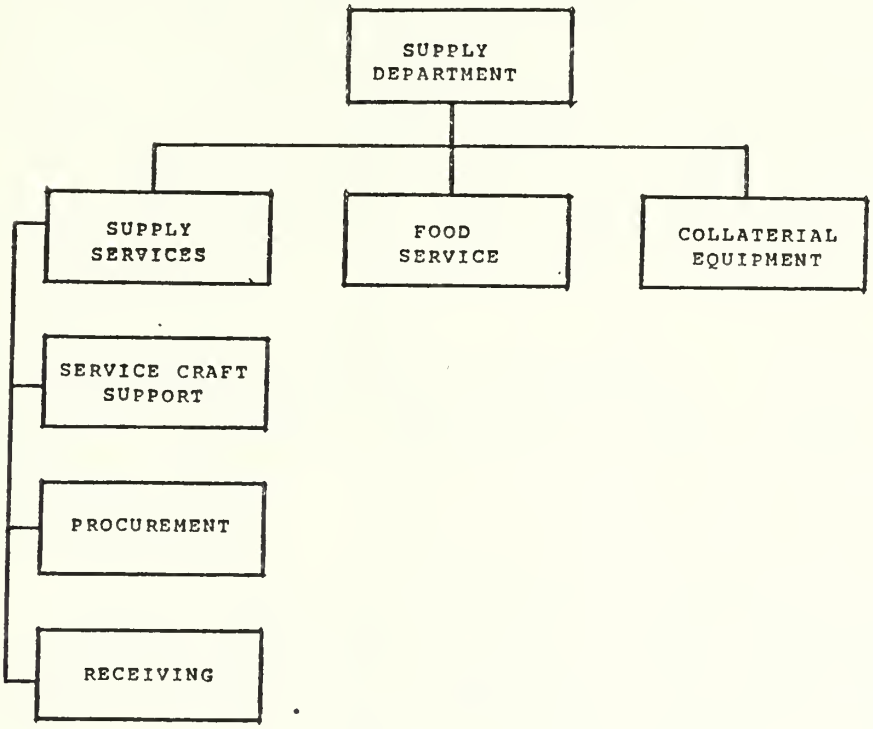
The mission of the Supply Department can be stated as:

> ....to provide supply services to all departments and offices of the Naval Station and limited supply support to shore activities and forces afloat [Ref. 60: Chart 9]

In order to accomplish this mission the Supply Department is separated into three divisions: Supply Services Division, Food Service Division, and Collateral Equipment Division. Figure 5.5 illustrates the organizational relationship of these divisions. Each division will be discussed in the following paragraphs.

a. The Supply Services Division

The Supply Services division is responsible for the procurement, receipt and local delivery of supplies and



[Ref. 60: Chart 9]

Figure 5.5 The Supply Department.

equipment for all departments. In addition, this division maintains the plant property records for Class 3 and 4 equipment and minor plant property. The Supply Services division is the "heart and soul" of the department and is responsible for those activities most commonly associated with the supply department. In addition, the division is further subdivided into three branches: Procurement, Receiving and Service Craft.

The Procurement branch is primarily responsible for the processing of requisitions for material and supplies, the submission of all invoices for payment, and

the maintenance of all plant property records. The procurement process is characterized by the fact that requisitions may be filled by a number of methods. Each of these methods is constrained by various regulations concerning the type of material that may be procured and the circumstances under which it may be utilized. The sources available for procuring materials are:

1. The Navy supply system,
2. Open purchase from local suppliers,
3. Blanket Purchase Agreements (BPA) with local suppliers, and
4. GSA contracts.

The Service Craft branch is organized to support the port services department. The primary responsibility of this branch is the supply management of repair parts and supplies for the various service craft assigned to the port services department. These service craft include tugs, yard oilers and harbor craft, and provide a vital service to the ships operating in and around the Hampton Roads area.

The Receiving branch is responsible for the receipt, issue and storage of items that the supply department stocks for all departments of the Naval Station. Cleaning gear and light bulbs are the major types of material stocked by the receiving branch. In addition, the receiving branch is responsible for storing and shipping seabags belonging to military personnel in an incapacitated, unauthorized absence or brig status. The maximum length of storage is 180 days; after which a bag is shipped to another activity for long term storage.

b. The Food Service Division

The Food Service division is responsible for the operation and management of the Naval Station's Enlisted

Dining Facility and 18 satellite[3] facilities. This involves the issue, sale and transfer of food items; this results in the sale of an average of 45,000 meals[4] per month. The operation of the division is divided into three areas:

1. Records and Returns--responsible for the determination of requirements, processing of all receipts and expenditure documents and the preparation of records and returns.
2. Food Storage--responsible for receipt, storage and issue of all food stocks.
3. Food Preparation--responsible for the preparation and service of all food products. [Ref. 59: p. 85]

c. Collateral Equipment

The Collateral Equipment Division is responsible for controlling the Naval Station's reutilization program. As a divisional entity, it acquires, stores, and issues excess material that may be utilized by naval station departments and offices. The division is responsible for maintaining accountability over all equipment and for effectively distributing this material to eligible users.

K. IN SUMMARY...

The verbal description of a "typical" naval shore activities, the supply department just presented, might leave the reader with the feeling of "so what?" The authors' intention was to ensure that the reader understood the importance of identifying the mission of the supply department and the

---

[3]These include small galleys on the tugs, a galley at the degaussing station and a mobile van that services the fire fighting school.

[4]Obtained during 31 August 1984 phone conversation with NAVSTA Norfolk's Food Service Recordskeeper.

organization of this functional area. Each of the divisions and branches in turn, must be analyzed in order to determine how it contributes to the department's mission. This analysis is an ongoing process. After the verbal description is considered satisfactory, then it is transformed into diagrams that depict the information/data flows between the various components that will make up the functional area. These data flow diagrams after approval, may be mapped to automated systems, depending on the needs and desires of the activity. The key point is that the IRM process involves much thought and discussion by the key personnel of the activity, prior to reaching fruition into a system that will meet the current and future needs of the command.

Webster defines process as "a continuing development involving many changes" [Ref. 52: p. 1133]. This is what encompasses IRM. A flexible, mature information system is constructed, utilizing the tools or building blocks of Information Engineering or some other similar methodology, to develop the required infrastructure that will serve the commanding officer and the activity. It is vital that each functional area go through the same thought process and then all of the functional areas be brought together and the activity viewed as a complete entity, prior to automation integration strategies commencing. In the authors' opinion, to do otherwise would be to develop a system that will fall short of fulfilling the mission of the organization, as well as the requirements of its users. Chapter VII looks closer at the step-by-step thought process behind the implementation of IRM, up to the automation stages. The chapter immediately following, investigates the apparent need in the opinion of the authors, for an IRM professional within the Navy.

VI. THE IRM PROFESSIONAL

A. THE TASKING

The following quote was taken from a July 1983, report to the United States Navy by a Committee to review the Navy's long-term ADP planning:

> Ensure that the Navy continues to provide and expands its ability to provide...a corps of experts to which units of the Navy can turn for assistance in planning for and using ADP technology [Ref. 2: p. 23].

The inference seems clear; the tasking pointed. But, presently, in the authors' opinion, there is no person or organization within the Navy structure that the commanding officer can turn to that has the expertise in implementing the Bases and Stations Architecture or planning the integration of IRM within the activity. The activities need help--specialized help, that will provide the expertise and skills required to ensure that viable, structured systems are the results of the commanding officer's efforts. Help in the structuring of systems that will aid in the decision making processes as well as increase individual productivity at all levels throughout the command.

The impact of automation and computers on all areas of management would be even greater today, if one could exploit the full potential of existing computer technology. Resistance to change in general and to "computers" specifically, cause some of the problems, but the failure to maximize computer potential is due primarily to lack of know-how. [Ref. 18: p. 557] The commanding officer is in a quandary. The broader issues of information management in support of Navy-wide management and command-decision

processes is not present at NAVDAC or the seven NARDAC's [Ref. 2: p. 16]. But with the issuance of the proposed Navy's instruction on Information Systems, the commanding officer is to "organize and integrate information management functions to accomplish mission goals" [Ref. 47: p. 3].

There is no one proper approach to information management, and the requirements that an information manager must possess. But the bottom line is that the implementation of information resource systems at the activity level will require a new approach and a change in the thinking of senior personnel. The new information professional must be able to grasp the essential motives and goals of the organization and then structure today's technology to execute those desires [Ref. 21: p. 16].

In the past, officers in the U.S. Navy have routinely been placed in positions of authority where they lacked the technical expertise in their job, but operated successfully in their new environment by employing good, fundamental managerial and leadership traits. However, the commanding officer of most shore activities normally does not possess the technical expertise in the area of information systems, nor does the commanding officer have personnel on the staff who maintain the appropriate skills. The question that the commanding officer at the shore activity is faced with is, which person do I put in charge?

In the corporate world, technical knowledge is still important, but employers are increasingly mentioning such management attributes as creativity, decision-making, and communication skills [Ref. 61: p. 8]. In the authors' opinion, this sounds much the same as the requirements of a good division officer or department head. But additionally, "Corporations are interested in cost efficiency. They want sharp individuals who are well-rounded, who understand all the components of the corporation and who are able to make

decisions on that basis" [Ref. 61 : p. 8]. This automatically leaves out the Ensign that is 6 months TAD to the base awaiting orders or the LTJG who is over-allowanced and has no previous experience of handling people or material. Additionally, to place the title of Information Systems Manager (ISM) on an already over-burdened department head or executive officer as a collateral duty, may possibly doom an information systems project to failure even before it has begun. Help is needed.

B. WHERE HELP CAN BE FOUND

Due to the unavailability of help within the Navy environment and the lack of expertise within the activity's organization, more and more commanding officers are turning to outside sources to supply consulting and information systems packages. These are expensive, usually short-term contracts, and do nothing to build a baseline of "experts" within the Navy to alleviate the anticipated greater need of information specialists over the next 2 to 5 years. NARDAC's focus their attention on the largest users and in the absence of NARDAC's, many users have to adopt less effective and less uniform ADP systems [Ref. 2: p. 17]. Additionally,

> NAVDAC (and indeed all aspects of the Navy and government/congressional procurement/oversight process) appears to have been too rigidly focused on computer hardware and, to a lesser extent, applications software, while having paid too little attention to policy development, strategic planning, and the potential of management-level information systems [Ref. 2: p. 15].

The axiom "a good manager can manage anything," could also be paraphrased to a good division officer or a good department head. But the one key ingredient that is missing from this formula, is that normally the inexperienced

officer had an experienced chief petty officer or first class petty officer, who could be relied upon in guiding the new officer over the rough spots. As information systems managers or implementors of automated information systems for the shore activity, personnel that have experience in the areas of computing, ADP, or the management of such resources, simply do not exist. In the authors' opinion the bottom line then stays the same--the commanding officer of the shore activity must either implement the Bases and Stations Architecture and integrate IRM for the organization using inexperienced information systems personnel at the commanding officer's disposal or pay excessive prices for civilian expertise. Both options leave no guarantee that the final product will be the information system that was originally envisioned by the users.

Various "system" or functional area standard software procurements have already been produced or are in the process of being produced, for the shore activities. Figure 6.1 shows two of the functional areas currently in various stages of implementation. Note the use of older "Mainframe" type hardware--one hopes that compatibility and portability do not become issues when the software is made available to the activities. Even with the standardized software packages in hand, the commanding officer is still faced with the task of integrating these "standardized" packages on hardware that must be procured through other sources. Additionally, the activity's Information System Manager will have to "tailor" the packages to fit the organization as well as the hardware environments of the command. Finally, what future support and documentation will be available for these "system" packages is unclear. The authors feel these functional area software packages have all the earmarks of buying "a pig in a poke" with little or no support provided and the activities lacking the qualified personnel to implement them properly.

TYPICAL SYSTEM PROFILE

	BEST	NCPDS
• PURPOSE	BASE ENGINEERING SUPPORT (PUBLIC WORKS)	CIVILIAN PERSONNEL DATA SYSTEM
• SYSTEM SPONSOR	OP-04	OP-01
• SYSTEM COST (LIFE CYCLE)	$45M	$257M
• NUMBER OF SITES	85	131
• EQUIPMENT INVOLVED	HONEYWELL DPS-6 SERIES	BURROUGHS 6700/2900
• IMPLEMENTATION	APR 84	JUNE 1984
• DATE LAST SYSTEM INSTALLED	JAN 87	DEC 1985
• ASSISTS BASE CO?	YES, VIA PWD	YES, VIA CIVPERS OFFICE

[Ref. 11: unmarked]

Figure 6.1 Typical System Profile.

C. WHAT CONSTITUTES AN INFORMATION SYSTEMS MANAGER?

> The hardest concept of Information Resource Management (IRM) for today's DP/information processing manager to grasp is the management process itself.
>
> Although the challenges lining the IRM road appear to mirror those confronting present-day information processing management, they are in reality only mirages. Traditional management principles take on a new meaning and concept within the IRM framework.
>
> To be successful in this hostile environment, the so-called "information resources professional" must assume the role of a ringmaster.
>
> Standing in the "center ring," he or she must be able to bring the potential chaos of the organization "circus" into harmonious balance. That is, fuse the other rings of the organization together to form a cohesive, synergistic information resource show. The IRM "ringmaster" must be able to deal with the clowns, lion tamers and high wire artists of the organization, while at the same time juggling the concerns of the DP department. [Ref. 62: p. 17]

Maybe a little over-dramatic, but the inference is quite clear--the information system managers of the 80's and beyond, must be managers par excellence. The authors feel that the individuals should report directly to the commanding officer and have the responsibility for the information system as well as the authority to make the required decisions necessary during implementation stages of the system and beyond.

At a minimum, this individual should:

1. Understand the various functions of the command, their inter-relationships, and the overall mission and objectives of the functional areas as well as the organization.
2. He/she should be able to translate the organizational objectives into resource requirements and provide standards to honor them.
3. The information systems manager (ISM) should be able to plan and control the required resources and standards to maximize their utilization throughout the activity.

4. It is imperative that the ISM establish visibility on all known and planned (manual and automated) systems within the organization with a look toward compatibility and future information exchange.
5. The ISM should create a committee of technical and user representatives from the functional areas, to evaluate and approve usage without redundancy, using accepted project management techniques.
6. The area under the ISM's cognizance, should be staffed with result and people-oriented personnel that are keenly in tune with the command's goals and objectives. [Ref. 29: p. 72]

This person should excel in organization, communications, and the ability to achieve results through people [Ref. 32 : p. 106]. Academic and/or technical credentials are essential, but one of little use if the ISM is unable to fulfill the aforementioned capabilities. The reader must not be misled by this statement though. The technical and academic qualifications are extremely important (a two week training command environment type school will not suffice in providing the ISM technician with the tools to successfully implement a multi-million dollar project for an activity). But with all the expertise in the world, the technical manager/implementer would be unsuccessful if he lacked good management techniques.

Top management needs to understand what it takes to manage information; the systems and methods used to communicate and their related resources. Since more than 70 percent of an organization's information is obtained through manual systems and methods, it behooves senior management to recognize its significance [Ref. 29: p. 72]. When top management of the activity or command recognizes and assigns the proper caliber of talent to lead the critical, sensitive

area of information management, the entire command will reap the benefits of the return on investment from the time and resources utilized.

It would be foolish for an ISM to ignore the complexity of the organization in which an Information Resource Management program is being introduced. The political and social factors within an organization will be more important in determining the direction of an IRM program than all the skills of the ISM. In the authors' opinion, the ISM must try to implement the automated technology and IRM to the structure of the organization as it exists, and not try to change the structure of the organization to fit the system. The manager should carefully assess the political and social environment within the organization and develop programs that will be in concert with the organization's structure, mission, objectives, and operations, both on a formal and informal basis [Ref. 50: p. 47]. The future looks complex, because in an environment in which literally everyone can have instant access to information, complex arrangements will required if the interests of each group and individual are to be granted a certain legitimacy through rational process. [Ref. 63: p. 67] The ISM must act in the face of uncertainty to grant these desires without the luxury of a full understanding of the system or its functions for the most part.

D. IS AN ISM REALLY REQUIRED?

The reader could argue very convincingly, that a Naval shore activity could probably do without the services of an ISM in the implementation of IRM at the command. The growth in demand for MIS managers and DP personnel, which fell or at least leveled off during the recent economic recession, has bounced back with vigor with the recent sustained,

steady growth of the economy [Ref. 61: p. 1]. This would seem to indicate, in the view of the authors, that corporate top management does not truly feel the information system that they maintain, is the "indispensible" tool that many MIS managers purport it to be. If required to initiate corporate cost cutting or "fat trimming", then the MIS departments are scaled down and systems implementation plans are held back as first maneuvers of top management to cut costs. Using the above criteria, the authors feel that one must question the validity of the information system in the first place.

In the authors' opinion, the reasons for this are many and varied, some of which include:

1. Information is <u>not</u> viewed as a resource by top management.
2. It is difficult to quantify or see the tangible benefits of information, as can be done with production, manufacturing, or other functional areas.
3. Most corporations work on dollar and cents profit margins and areas that cannot be viewed in those terms, are some of the first to be cut when belt tightening is required.

"Corporations are interested in cost efficiency. They want sharp individuals who are well-rounded, who understand all the components of the corporation and who are able to make decisions on that basis" [Ref. 61: p. 8], states Jaye Squire, director of sales for Business People, Inc. He goes on to state that employers are mentioning the attributes of creativity, decision-making, and communication skills as prerequisites of their MIS managers. The authors support this observation, but feel that it is also critical that the ISM's need to be of high quality if they are to survive in the organizational structure.

The commanding officer of the shore activity at this point, may again feel that the requirement for an ISM may be waived. Shore activities are not cost centers, but by the same token, money is not available to be wasted on areas that will not provide "tangible" benefits. IRM and automated systems are coming to the Navy in general and to the shore activities in particular. The commanding officer of the activity can view the situation much like the commercial on television that states, "You can pay me now, or you can pay me later." In the near future, the commands will not have a choice of whether they implement IRM or not, and will probably be placed under a time schedule by higher authority that could be unrealistic in formalizing a viable implementation at the shore activity. The authors believe that the IRM process is here to stay, so the commanding officer that utilizes the services of an ISM and a structured methodology for implementation, will enable the command to reap the future tangible and intangible benefits of such a system not available to those commands that wait for specific guidance.

E. DIRECTION FROM HERE

> To successfully implement IRM concepts, information systems executives must be held directly accountable for all successes and failures in the information processing and handling environment, and must be in a position to freely express different viewpoints and interest with all levels of management. Only one executive level manager must have the authority to approve all equipment, software, and personnel additions and replacements to maintain compatibility with the overall organization environment and preagreed goals. Under these circumstances, meaningful significant changes in the information processing and handling environment can be made. [Ref. 23: p. 58]

In the opinion of the authors, the commanding officer of the Naval shore activity must begin incorporating the ideas and concepts of IRM for the organization today. Looking objectively and critically at the IRM concepts as previously

discussed, the activity is likely to benefit by coordinating the usually fragmented and uncontrolled information processing and handling environment expected to be covered by the IRM function and the Bases and Stations Architecture. The degree of success and benefits achieved, will depend mainly upon the degree of top management's real commitment and the careful handling of the command's transition through the IRM stages by the ISM professional. [Ref. 23: p.58]

As discussed by the authors previously, the commanding officer has two options available in providing the organization with an ISM professional:

1. Appoint someone that already exists within the command structure, either military or civilian; appointed either as a collateral duty or a "full time" job, or
2. Contract or hire an information specialist from the civilian sector.

The pros and cons of the choice were presented in earlier sections of this chapter. Needless to say, the choice is left to the commanding officer of the activity, for who knows the command better; its needs, wants, objectives, and mission. The authors would lean toward the internal choice, especially in the early stages of the IRM/architecture implementation, with technical expertise sought only after the problems and direction of the system implementation have been explored and planned for by top management. The immediate skill needs required by the ISM, would favor an industrious manager, a "politician", and an individual that can think in a "Big Picture" or total organizational framework. Additional skill requirement deficiencies can be alleviated through continuing education. At best, the choice will be subjective in nature, depending on variables too numerous to mention. But, the choice must be made if the proposed system is to be implemented to serve the needs of its users.

The following section presents factors to be considered by the command in trying to fill the position of ISM; a "job description" if you will. These are entirely of the authors' views on the subject and are open to arguments/discussion from the reader. The final section of this chapter delves into the possibility of an officer designator for an information systems professional for the U.S. Navy.

F. PROPOSED INFORMATION SYSTEMS PROFESSIONAL REQUIREMENTS

In order to successfully implement IRM within the organization, the information professional must be a management individual. The information professional should be assigned to an organizational identity that is equal to and, capable of functioning on the same level as the other department heads. [Ref. 62: p. 17] As the IRM professional, the ISM must deal in the same context and "language" as the other department heads of the organization. The ISM should be viewed as one of the same, rather than as a person "apart from the crowd." [Ref. 20: p. 84] As a professional, the ISM should fall within the following general definition:

> Professional occupations or series are those that require knowledge in a field of science or learning customarily and characteristically acquired through education and training that meets the requirements for a bachelor's or higher degree with major study in or pertinent to the specialized field, as distinguished from general education. The work of professional positions is creative, analytical, evaluative, or interpretive; and is characterized by personal responsibility to keep abreast of and exercise judgement and broad perspective in the application of an organized body of knowledge that is constantly studied to make new discoveries and interpretations or to improve the data, materials and methods. Also included are positions filled by trainees who meet the basic knowledge requirements and who perform work in preparation for fully professional. [Ref. 64: p. 6]

In addition to the computer technological skills, the proposed ISM or information professional, should possess the attributes of a :

1. Planner- The very nature of information management requires that information managers be planners. The IS manager must aid in the developing organizational strategies for the future; become the catalysts for planning at all levels throughout the activity for the information system.
2. Change Agent- The very work accomplished by the ISM dictates that change will take place. Change should be introduced with care, patience, and sensitivity. Change may be gradually integrated over time or take place drastically. The ISM shall dictate the pace of IRM assimilation throughout the activity.
3. Information Manager- The ISM must determine how best to integrate the information function into such areas as word processing, administration, and telecommunications. The ISM will serve as consultant, innovator, and "expert" to determine the path of information throughout the organization.
4. Proactivist- To be responsive to the users' needs throughout the command will not be enough. The ISM will have to be aggressive if the information is to become the heart of the organization. Only through understanding the technology and applying the same to the users' desires, will the activity achieve the best mix of technology to the command's needs.
5. Business Manager- The tools of information management and bringing the automated technologies to the users, can be quite expensive. The ISM will need a solid understanding of both business and technology to effectively integrate information management to the users' needs in the most cost effective manner.
6. Politician- Political strategies are an important part of turning the power structures or organizations into a positive force for the spread of technology.

As a good politician, the ISM can influence users and top management personnel and lead them through the maze of technology to the acceptance of information and systems planning for the organization. The political side of information management requires such skills as the ability to recognize power bases (both formal and informal); the development of awareness, sensitivity, and communications skills; and the interpersonal skills needed to "win friends and influence people" in the organization.

7. Integrator- The integrating of distributed systems, of office automation systems, of electronic information and service systems, and the management planning and control systems will require an integrator of the organization's information resources. The integrator role will merge microcomputers, communications, and databases into effective delivery systems that will bring information resources to managers and staff throughout the organization, when and where needed.
8. Information Controller- The spread of sophisticated and expensive technical resources throughout the organization will require extra care in the management of these resources. The result could be more than just costly and inefficient operations; it could be loss of control. As information controller, the ISM will preside over information management, exercising the three C's of control--coordination, consistency, and compatability--to ensure efficiency and effectiveness in the use of information resources distributed throughout the activity.
9. Strategist- Management by strategies might provide a methodology or view for increasing the effectiveness and the influence of the information management function in the organization. The ISM must be cognizant

of the command's overall strategies as well as the individual strategies of each functional area and where they complement each other and where they depart on divergent paths.

10. <u>Staff Professional-</u> The ISM as the information czar is generally recognized as a "staff" professional in the organization. As such, the ISM is expected to provide technical guidance, technological forecasts, decision support systems, researched-based information, and computer-based systems of all kinds in support of the organization's activities and management. If the ISM is to maintain respect and credibility as a staff professional, however, technical knowledge and education must be continuous.

11. <u>Manager-</u> In addition to being staff professionals, ISM's are also just that: managers. They just don't manage technology. They also manage people, equipment resources, systems projects, user relations, management interfaces, budgets and capital expenditures, <u>and</u> technology. The individual who manages all of these things successfully, especially at a naval shore activity that encompasses such diverse functions, is not just a technician; the ISM is a professional manager--a manager with a technical specialty, but a professional manager nevertheless. [Ref. 4: pp. 47-52]

The authors would be quick to point out, that this is not an all inclusive list of potential qualifications that the commanding officer should consider, prior to filling the position of ISM for his activity. The list would probably change somewhat based on individual problems inherent to each activity, as well as financial considerations to the affordability of such a person, etc. But, the list does

provide the commanding officer a beginning point on the traits/skills that the activity's ISM should possess or possess in the future, as the IRM infrastructure traverses toward maturation. These skills are necessary, if the integration of a methodology to implement IRM is to be successful for the naval shore activity. With this section and an instruction for writing position descriptions, the commanding officer should be able to draft the requirements for an ISM for the activity. The bottom line is that <u>the ISM must possess the requisite skills to make the necessary choices, to build the resultant organization and procedures, and to motivate and control the organization to achieve the desired objectives</u> [Ref. 38: p. 16].

G. THE CASE FOR A PROFESSIONAL ISM OFFICER

The following quote speaks to the governmental information manager's rise in importance within the government framework:

> If one examines the organizational charts and telephone directories of major Federal agencies, it is apparent that the management support cluster of functions is gradually gaining some ascendancy. Traditionally these functions have been stifled by the fourth category--administration support. Among the "classic" organizational battles which have taken place are:
>
> 1. The change in titles at the top organizational level from "admistration" to "management."
>
> 2. The shredding out of the ADP function from under the control of financial managers, to separate status, either co-equal to, or under, or reporting directly to a generalist manager, such as a deputy administrator or under secretary.
>
> 3. The growth of specialized information centers and their organizational placement at higher organizational levels.
>
> 4. The rise of telecommunications management and its corresponding high location on the charts, as a result of the need to manage high speed data transmission and keep abreast of skyrocketing communication costs and new communications technologies.

5. The gradual erosion of organizational boundaries between statistical functions and information functions. In lieu of calling major statistical capabilities in Government "statistical centers," we are seeing names like "data" or "information and statistics" center.

6. The ascendancy of the planning and evaluation staffs and their heavy reliance on data as the raw material that "feeds" their activities.

7. The emergence of public policy management as a field of study.

8. The emergence of resources management as a field of study. [Ref. 36: pp. 248-249]

The reader may infer from the above list, that the one important, common denominator involved, is that data and information are the critical resources which each of the organizational functions requires. Most of the new management specialized functions depend on information as the critical resource. The U.S. Navy, in the authors' opinion, is no different from the rest of the government areas, in that information is a critical resource and that these new organizational functions are forcing the definition of the role of the information manager.

In the Committee on Review of Navy Long-Range ADP Planning report presented to the U.S. Navy in July 1983, the following statements were obtained:

> It is the committee's observation that skilled ADP technical specialists seem most challenged and exhibit the greatest dedication when the top management of their commands understands and appreciates the contribution and potential of advanced information systems. This is particularly true in the case of military members of the ADP organizations, for whom assignments in ADP are not universally regarded as enhancements to a Naval career.
>
> It was quite clear to the committee that assignment to an ADP billet was likely to be detrimental to an officer's career. The committee observed that this policy (whether consciously established or the result of other decisions) is counterproductive to the objectives of the Navy. Instead of conserving a scarce manpower resource, the policy ensures that a deficiency of skilled ADP personnel will be permanent. This, in turn, compromises the Navy's ability to address more fundamental issues, such as productivity improvements. [Ref. 2: pp. 18-19]

The report went on to state that one of the recommendations of the committee was that the office of NTADP should, "Act as advocate for the establishment of personnel policies and standards and the development of career patterns (the authors highlighting) that enhance the Navy's ability to acquire, train, and retain competent ADP specialists" [Ref. 2: p. 21].

VII. IRM IMPLEMENTATION METHODOLOGY

A. INTRODUCTION

Peter Drucker has stated:

> We are beginning to realize that the computer makes no decisions; it only carries out orders. It's a total moron, and herein has its strength. It forces us to think, to set the criteria. The stupider the tool, the brighter the master has to be--and this is the dumbest tool we have. . .It shows us--in fact, it compels us--to think through what we are doing [Ref. 18: p. 557].

The impact of computers on the management of most shore activities has yet to be recognized, and the impact would increase drastically if the full potential of computer technology were exploited. In previous chapters, the authors have discussed how most shore activities are experiencing a proliferation of computers under the general auspices of "getting out of the dark ages". However, the authors' research indicates that few, if any, shore activities have adequately reviewed why they are buying computers, how the computers will be used, or if the use of the computer will be cost-effective. The authors would contend that most shore activities have not "thought through the process of what they are doing or why they are doing it."

B. OVERVIEW

Chapter VII is an attempt to provide the top management of a shore activity a check-off list or "cookbook", that will enable them to think through the process of implementing IRM. The methodology presented will follow the basic concepts of James Martin's Information Engineering, but will be structured to reflect the environment of a Naval

Shore Activity. Figure 7.1 illustrates the six steps of this methodology. Subsequent sections of this chapter will discuss each of these steps in greater detail. Additionally, where applicable, examples from the supply department (discussed in Chapter V) will be provided.

Table VI through Table IX summarizes each of these steps in an easy to use "bullet" format. The key points are presented for each stage and additional insight is provided by comments and/or probing type questions.

C. PROPOSED STEPS OF IRM IMPLEMENTATION

1. Command Support Development (Step 1)

Command Support Development is an attempt by the commanding officer to develop a command wide interest in Information Resource Management and to motivate the department heads to support the implementation process. The commanding officer must convey a philosophy on IRM, define specific policies for implementing IRM, and establish a clear understanding of the goals.

This is no easy task and the reader may feel that an undertaking of this magnitude is beyond the call of duty for a commanding officer. After all, the commanding officer probably has little knowledge in this area and more importantly, the job of being commanding officer of a shore activity already requires 25 hours every day, let alone adding another project. The authors do not discount this viewpoint; however, the commanding officer must recognize that direct involvement is the single most critical factor in implementing IRM, and without the personal commitment of the CO, the entire project will lose visibility and never achieve the creditability necessary to identify the activity's information needs.

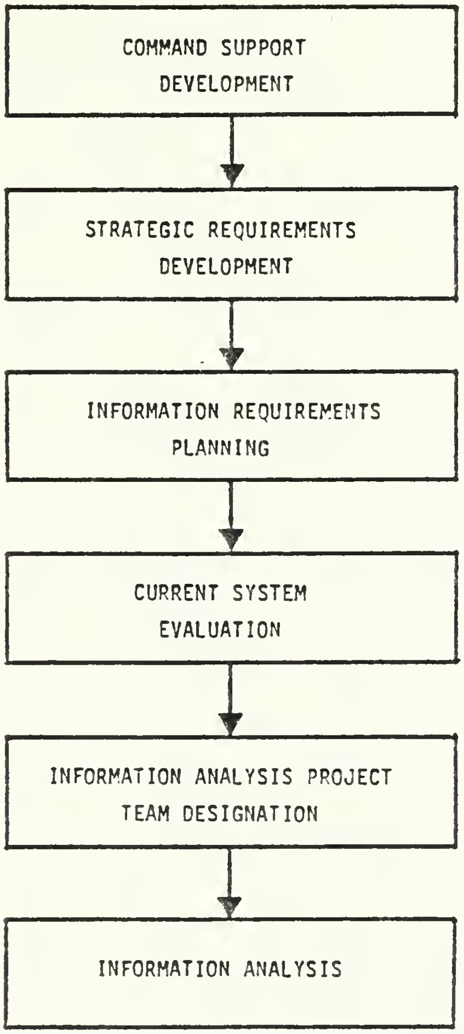


Figure 7.1 Proposed Steps for IRM Implementation.

The authors recognize that a commanding officer cannot devote a major part of every day to implementing IRM. Therefore, it is crucial that the CO appoints someone to coordinate this project. The commanding officer must still take an <u>active</u> part in the entire project, but this "information system manager" must be given the responsibility of overseeing the project and the status and "horsepower" to effectively function in this postion. Chapter VI discusses the role of this individual and the qualifications necessary for this job. The authors recognize that few, if any, commands will have an individual who is educated and trained to fill this postion. However, the authors' intent in discussing this point is to emphasize that until qualified people are available, it is imperative that the position be filled by the most competent person available.

Since an Information System Manager (ISM) will be required to wear many hats, it is imperative that the job be assigned to an experienced and knowledgeable person who is capable of dealing with all levels of management. The authors perceive that in most activities this will channel the assignment to either the executive officer or to one of the department heads. However, rarely will these individuals have sufficient time to devote to implementing a project of this magnitude. Who then is to be assigned this job? The authors feel that there is no specific answer to this question. Rather, each activity will have to evaluate its organization and attempt to identify the most capable individual who can devote a sufficient amount of time to this project. Ideally, it would be desireable to hire a qualified individual and assign this individual to the commanding officer's principal staff, but the cost, as well as finding one that is truly qualified, may inhibit this option.

An activity's education plan is the key to developing support throughout the command. However, the commanding officer must gain an understanding of IRM before this plan can be undertaken. At the same time, the department heads must also be exposed to the principals of IRM. The authors offer this thesis as a source of information for providing a basic understanding of the principles of IRM and the process for implementing such a system. In addition, the bibliography provides an excellent source of current articles on the subject of IRM. Regardless of the method of exposure (i.e., formal presentation, group discussions, or individual research), it is vital that the activity's top management (CO, XO, key staff members, and department heads) develop an understanding of IRM, its relationship to the mission and goals of the activity, and the projected benefits of such an implementation to them as the upper and middle management of the command.

The activity's education plan might be used as the initial step in developing a Plan of Action and Milestones (POA&M) for implementing IRM. A POA&M is necessary in order to structure the implementation process into something that can be viewed and understood by the entire organization. It enables an orderly expansion to be planned and periodic reviews of progress to be established.

The authors will not attempt to develop a "typical" POA&M, since it is felt that each commanding officer will have an approach to organizing a project of this scope. Regardless of the final product though, it is essential that the POA&M be structured to convey a long range view of the organization and the identification of actual user needs. The goal must be the identification of actual needs, in lieu of perceived needs or nice to have items.

2. Strategic Requirements Development (Step 2)

Strategic Requirements Development is an attempt to establish or define the strategic direction and objectives of the activity for the future. It is structured to identify the critical success factors [5] (CSF's) of the activity. These factors will support the attainment of the activity's goals. However, the importance of identifying the critical success factors lies in the fact that the identification process documents the areas in which good performance is necessary to ensure attainment of the activity's goals. [Ref. 6: p.81]

It is important to point out that critical success factors are not permanent, particularly in the dynamic environment of the Navy. An organization's mission could be altered or internal considerations could lead to a set of temporary critical success factors. The key here is for the commanding officer to clearly define those factors that are crucial to the success of the activity in the period being covered by the planning process. [Ref. 6: p. 87]

The crucial role of the commanding officer during Strategic Requirements Development cannot be overemphasized. The CO must be an <u>active</u> participant in this process, and must ensure that all key staff members and department heads take an active role. The CO must develop the view of Strategic Requirements Development as an organized and structured approach by top management to formally evaluate the mission and purpose of the activity.

The commanding officer must provide the initial strategic viewpoint of the organization, as well as providing the strategic implications of various functions and goals. In addition, the CO must act as a referee,

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[5] The limited number of areas in which results, if they are satisfactory, will ensure successful performance for the organization [Ref. 6: p.81].

preventing department heads and staff members from attempting to gain a political advantage or attempting to use the evaluation process as a means to attempt to build an "empire". When redundancy issues arise or parallelism of function is evident, the CO must make decisions as to which functional area is in charge of what data. The commanding officer's role and participation during this critical process is the most important critical success factor for implementing IRM at a shore activity.

The Strategic Requirements Development stage will give top management a fundamental understanding of the activity (if done correctly, it may be the first insight for some participants into the role and duties of other functional managers) and enable top management to identify the information that is essential for its operation. This organizational viewpoint and the key informational needs can then be formulated into objectives for each individual functional area.

The objectives for each functional area should be derived from an understanding of the activity's goals and objectives. These functional area objectives must be supportive of the activity's goals and objectives, and provide direction for each department head and his particular functional area. [Ref. 28: p. 170] Only by identifying activity and functional area objectives can an activity hope that an information system will take these objectives into account and identify data relevant to those objectives.

So far the discussion of Strategic Requirements Development has focused on identifying the activity in its present structure. However, it must be recognized that strategic requirements development also emphasizes the current organization so that a starting point is established. Once this framework is constructed, the structure can be built upon by projecting the requirements of the

activity for the future. Strategic Requirements Development emphasizes the current roles, products, and services of an activity, but also attempts to identify these same attributes for the future. [Ref. 28: p. 160]

A detailed examination of the purpose and mission, and the roles, products and services of an activity is no easy task. It is a time consuming process that forces top management to step back from the present and evaluate the requirements of the activity for the future by recognizing its functions from the past. Often it is difficult for people close to an activity to divorce themselves from today's problems and to look to the future. Regardless, it must be done. Top management must set aside individual parochial views and work as a unified and cohesive group. [Ref. 28: p. 165]

A word of caution is necessary at this point. Many readers may feel that a self-examination of this depth will require someone with no vested interest in the outcome of the review or with experience in systems implementation to act as a catalyst during the entire process. Such "consultants" are readily available in the civilian marketplace; but, they are not available as part of the Navy's information structure (this was discussed in Chapter VI). Regardless, the authors contend that an outside consultant may not initially be the best alternative for a shore activity at this stage of the IRM implemention. The Strategic Requirements Development stage might best be accomplished by the top management of the activity acting independently of outside influence.

The authors do not discount the fact that many consultants provide a valuable and useful service. Likewise, the authors also do not discount the fact that a consultant may be useful in one of the later stages of implementation. Instead, the following points are offered as justification

for an activity with limited strategic planning experience, to implement Strategic Requirements Development as an in-house project:

1. Strategic planning has been ignored for too long (this point was discussed in Chapter V), and it must be explored, developed and incorporated into the management of more shore activities. The use of a consultant will only perpetuate the lack of awareness and understanding in this area.
2. The top management of the activity will not gain a real understanding of the organization or of the infrastructure for developing an information system if a consultant is hired. Instead, the consultant will develop this understanding and will attempt to convey it to the appropriate personnel in briefings, or by means of written reports. Regardless of the vehicle used, the authors contend that the consultant will be the only person to gain a <u>complete</u> understanding of the organization. What happens when the consultant is no longer under contract?
3. The hiring of a consultant will probably require a timetable that will be too short for effective implementation of Strategic Requirements Development. Contract regulations and budgetary constraints will prevent an activity from hiring a consultant for the length of time needed to accomplish this stage properly. Instead, a compressed timetable might be suggested by the consultant or other members of the activity's management team. The end result might be an implementation process that is compressed to a point where only marginal success is possible.
4. Implementing Strategic Requirements Development as an in-house project will not structure the information

requirements towards a specific information system. The authors contend that most consultants will attempt to develop an activity's information needs in terms of specific hardware and software. By doing so, the consultant establishes a "position" for obtaining additional business as changes are needed or if problems should develop. Even more critical though, is the fact that this end product may not be easily translated or integrated into the Navy's view that will result from the Bases and Stations Architecture. In other words, the infrastructure that is developed for the activity will reflect the architecture of the tools and not the structures of the organization--its information flows, its people, its personality.

5. Perhaps the strongest reason for implementing Strategic Requirements Development as an in-house project, is that the activity as a whole gains an awareness of the methodology involved, and more importantly, this awareness is retained by the activity's personnel. A corporate knowledge of "why this was done" or "why this wasn't done" is developed. The authors contend that this is a key point to the future success of the implementation and that the knowledge gained is vital, particularly in view of the changing personnel structure of an activity.

3. Information Requirements Planning (Step 3)

Information Requirements Planning is the stage in which top management determines what information is needed to effectively manage the activity. It is based upon the strategic direction established during Strategic Requirements Planning and it enables top management to identify information requirement alternatives and priorities. [Ref. 28: p. 172]

Chapter V discussed three levels of management and the fact that each of these levels requires a different type of information. Information Requirements Planning is the stage where top management has an opportunity to discuss and identify the information needs of these various levels of management, and the potential benefits of providing that information. The benefits and costs of all information requirements are considered, and priorities are established. Given the resources available, the goal is to identify the information requirements that will give the activity the most "bang for the buck". [Ref. 28: p. 172]

It is vital that an activity recognize that the information needed by different management levels varies throughout the organization. Information Requirements Planning can aid in identifying the information needs of all three types of management. Subsequently, the information analysis stage will enable management to define the raw data essential to provide that information. [Ref. 28: p. 174]

4. Current System Evaluation (Step 4)

The authors assert that many activities will experience some difficulty in identifying information flows. Consequently, this step must be inserted here in the implementation process. Only through a thorough understanding of the organization's present information flows will the command be able to forecast the system architecture required of the future information system.

Current system evaluation is an attempt to determine how an activity gathers, stores and uses information. It must be conducted for each functional area, as well as for the activity. This process involves reviewing and documenting all present manual methods, as well as all currently installed automated systems.

The purpose of this process is to identify how and why the activity gathers information. It is an attempt to document all procedures so that they can be evaluated for effectiveness, efficiency and redundancy.

This process can begin as soon as an activity embarks on a goal of implementing IRM. It requires that the key personnel in each functional area identify all external and internal reports and how the information for these reports is obtained and processed.

5. Appoint an Information Analysis Project Team (Step 5)

In order to accomplish information analysis it is necessary that an organized and structured approach be established to evaluate and categorize all information needs. A small central group should coordinate the entire activity and each functional area should appoint a group to examine its individual needs. The central group has the responsibility of consolidating the data views from all functional areas, removing redundancies and resolving any conflicts that might arise. [Ref. 28: p. 187]

The authors perceive that the XO, ISM, and the department heads would comprise the central group, and that each functional area would develop its team based upon its personnel strengths. The commanding officer is excluded from this group because it is recognized that the CO will not be able to participate in most discussions. However, the authors feel that it is vital that the CO personally resolve all conflicts that cannot be settled to the mutual satisfaction of all members of the project team. This requirement will ensure that political infighting is minimized and that the implementation follows the commanding officer's projected vision.

6. Information Analysis (Step 6)

Information Analysis is a methodology, which incorporates top management's strategic direction, to identify the data required for effective organizational control [Ref. 28: p. 64]. It is based upon the premise that to understand and identify the data relevant to an organization requires a clear understanding of the organization itself [Ref. 28: p. 186].

Most organizations are divided into units or functional areas. Information Analysis recognizes this and the fact that management personnel in each functional area develop their own specific and unique information needs. However, the fact remains, top management requires consolidated and summarized data from these functional areas in order to perform in a decision-making role. Accordingly, Information Analysis takes a top-down approach in order to analyze data across the entire organization. It attempts to identify first the data which is most stable and least liable to change--the fundamental data that will always apply. In addition, Information Analysis also recognizes that organizations change and it attempts to identify data which is the most vulnerable to that change. [Ref. 28: p. 186]

As an activity progresses toward the Information Analysis stage of IRM implementation, the impact of the Information Analysis Project Team becomes important. The authors contend that their role as overall coordinators of this stage must not be viewed lightly, for without a unified and structured approach it will be extremely difficult for the team to obtain an accurate overview of the activity's data.

Figure 7.2 depicts six different procedures for Information Analysis. Each of these procedures should be

viewed as having a specific purpose and a specific output. The authors will describe each procedure in the following subsections and provide examples applicable to the supply department discussed in Chapter V.

a. Initial Data Identification

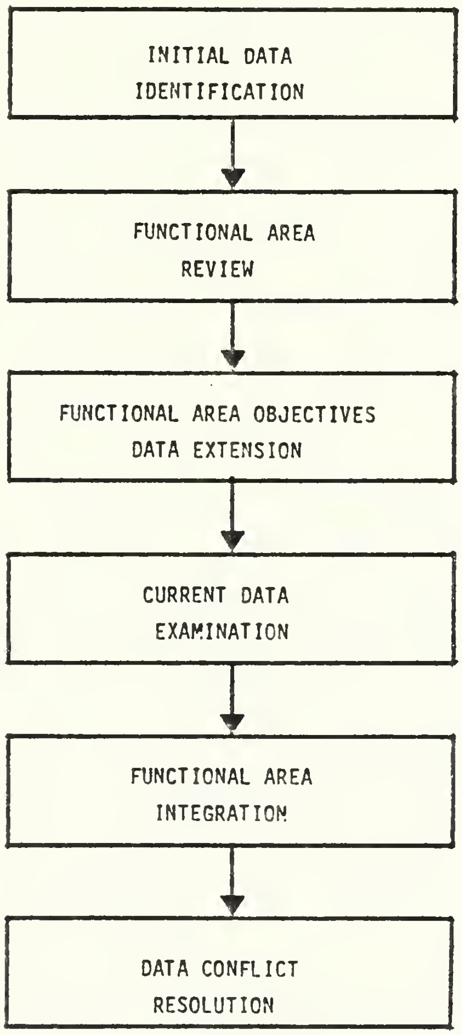
This procedure reviews the purpose and the mission of the organization and attempts to identify the data that is fundamental to the organization now and into the future. Top management involvement is crucial to achieve success in this procedure, since their interpretation of the activity's purpose and mission is vital. [Ref. 28: p. 187]

The objective of this procedure is an initial data model and the identification of key data subjects. [Ref. 28: p. 196] The authors contend that this procedure should proceed fairly smoothly if the previous steps of the implementation process have been followed. After all, the strategic direction has been emphasized as has the critical information needs of top management. However, any attempt to jump immediately into this procedure, without having completed the previous stage, would be extremely difficult.

A return to the supply department may be helpful in providing an example of the data subjects being discussed. The authors will assume that the following data subjects might have been identified during this procedure:

1. Plant Property.
2. Priority Requisitions.
3. Invoices.
4. Enlisted Dining Facility (EDF).

Although all of these data subjects are directly associated with the supply department, it is important to note that only the data subject "EDF" is likely to be strictly a



[Ref. 28: p. 188]

Figure 7.2 Information Analysis Procedures.

concern of the supply department. Each of the other subjects have applications and/or correlations to other functional areas within the command.

A word of caution is necessary at this point. The authors would suggest that it is extremely easy to become overwhelmed and confused by the question of how much detail is required in this procedure. The purpose here is to create an overview--a framework for a more detailed model to be constructed later in the process [Ref. 28: p. 193]. The authors contend that any attempt at too specific a level of detail, will be counter productive and should be avoided. In addition, the subsequent procedures in information analysis will most likely identify any oversights.

b. Functional Area Review

This procedure requires that each functional area review the subject list developed in Initial Data Identification, concentrating on those subjects relevant to its specific area. [Ref. 28: p. 213] This procedure expands the data identified in Procedure (1), by incorporating additional data identified from a functional area perspective. In most cases, this functional area perspective will also identify various attributes [6] for each data subject. Each attribute must be defined and clearly documented as to its corresponding data subject.

The supply function will again be utilized to provide an example of this procedure. Table IV indicates the attributes the data subject "priority requisitions" might possess.

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[6] Attribute--characteristics of the data subject which we want to record (i.e., size, color, address, quantity)

TABLE IV

An Example of Attributes

Data Subject	Attribute
Priority Requisition	Requisition number Document number Priority RDD Unit price NSN Quantity

c. Functional Area Objectives Data Extension

This procedure recognizes that no two similar activities will ever strive for exactly the same objectives; but depending on the organization's environment and the make-up of top management, will define unique and specific objectives. These objectives are projected downward to each functional area, which in turn develops its own objectives. [Ref. 28: p. 190]

This step is an attempt to review the activity's objectives and to verify that these objectives are projected down through the organization, resulting in supportive functional area objectives. After this is accomplished, the data necessary to measure objective achievement is determined. Reviewing the objectives in this manner identifies the data upon which decisions are based and expands the data model developed in the previous procedures. [Ref. 28: p. 191]

In order to use the supply function in further examples, it is necessary to make a number of assumptions. The authors will assume that an objective of the activity is

to maintain a high "quality of life" posture for all personnel, both permanent and TAD, assigned to the command. This activity objective is translated in the supply function to an objective of operating an EDF that provides appetizing and nutritious meals, within the established cost constraints.

The authors feel that in order to measure the achievement of this objective, a number of factors must be considered. The records and returns maintained by the Food Service Officer will identify the financial status of the EDF. Specifically, the NAVSUP Form 338 indicates the financial status on a daily basis. However, the determination of quality and appeal is much harder to quantify or measure. A meal evaluation report by a designated individual or by any patron of the EDF will provide some indication of the <u>individual's views</u> on the meal evaluated. However, it should be obvious to the reader, that it is extremely difficult to quantify this aspect of the functional objective.

The authors chose this particular example, in order to demonstrate that many objectives involve intangible aspects that are difficult to quantify and/or to identify specific data upon which to measure achievement. Regardless, every attempt should be made to ensure that specific data is made available to measure achievement of intangible objectives.

d. Current Data Examination

Current Data Examination reviews the data that is presently used by the activity. This involves reviewing all reports, source documents, ledgers, etc., and identifying all data subjects and attributes. [Ref. 28: p. 191]

It should be pointed out that the previous steps identified both current data and future data. However, the

future data may or may not exist at the present time. This procedure is an attempt to cross-check current data in order that the activity can move to the future. This step will produce a data model that can then be compared with the data model developed earlier in Procedures (1) through (3).

An example of the results of Current Data Examination could be provided by reviewing the procurement branch's supply log for standard stock material (a separate log is kept for each type of procurement). This log book is used to record information on all standard stock requisitions submitted to the supply department. Table V identifies the type data that might be found in this log.

TABLE V

Current Data Items

Date	Document number
Priority	Requisition number
NSN	Name
Cost	Receipt date

e. Functional Area Integration

This procedure combines the functional area data models and subject lists developed in Procedures (1) through (3) and incorporates the essential data from Procedure (4). [Ref. 28: p.191]

Many redundancies will exist between the data identified in the various functional areas. For example, data subjects may be referred to by different names in

different functional areas or even--in the same functional area. The reader must keep in mind that the objective of information analysis is to achieve a coordinated overview of the data subjects throughout the activity. [Ref. 28: p. 191] Keeping this in mind, the authors view this step as extremely important and one that should be carefully structured. It is likely that data will be identified that may not presently exist in the current data structures of any functional area. In addition, data may have been identified that is not really required--data that someone thought was needed. In either case, action should be initiated to resolve the status of these data subjects and any other questionable data subjects.

f. Data Conflict Resolution

Data Conflict Resolution is an attempt to resolve conflicts and controversy over the definition and accountability status of data shared across functional areas. It is a means of determining what functional area is responsible for creating and deleting data that is shared. In addition, this procedure requires that all users of shared data be identified. The resolution of all data "conflicts" is the objective of this procedure. [Ref. 28: p. 192]

g. Summary

The six procedures for information analysis have developed a list of data that is fundamental to the activity. This data is necessary for day-to-day operations, to be utilized for the measurement of objective attainment, and is crucial to the decision-making process [Ref. 28: p. 204].

Once again, the authors point out that a specific discussion or mention of computers has not been

made. The purpose of the preceding data analysis has been to provide a methodology that would enable the activity to identify _why_ and _how_ it will use computers to "lighten the load". The authors contend that only now, after building the activity data model and information flows, can these questions be addressed. The authors perceive that an activity that has progressed to this plateau is now ready to incorporate computer technology to automate the activity's functional areas and the information flows that link these areas.

TABLE VI

Command Support Development

DEFINE IRM.

What is IRM?

What is it going to do for the activity, for individual managers?

Define your philosophy, your goals and what the project will do.

What policies and procedures will be used to impart your philosophy throughout the activity?

EMPHASIZE THE LONG TERM PERSPECTIVE

IRM will not be implemented overnight, but rather, over a timeframe defined in months.

IRM must be viewed as an evolutionary process that will depend on the current organization and its mode of operation.

Your view towards IRM will change through time.

The present organization must be viewed in terms of the future.

DEVELOP AN EDUCATION PROGRAM

How do we educate the personnel of the command?

Who should be included in the education program?

Table VI

Command Support Development (cont'd)

DEVELOP A POA&M

How detailed should this plan be?

How long a period should the plan cover?

Will the plan bring about control, which will enable further time to plan?

Is the plan simple enough to succeed but specific enough to structure the actions of the activity.

Do department heads feel that the POA&M is realistic?

APPOINT AN INFORMATION SYSTEM MANAGER

Is there a qualified person presently assigned to the activity?

Is it possible to hire a qualified person?

If a present staff member must be assigned, can the person be expected to interact will all departments impartially.

How much time will the staff member be able to give to the project?

TABLE VII

Strategic Requirements Development

DEFINE THE ACTIVITY.

What is the activities mission?

Who do we report to, who reports to us?

What activities do we support, what activities support us?

Do we anticipate any changes in the the present structure?

STATE ACTIVITY OBJECTIVES

What are the objectives of the activity?

What is the priority of each objective?

Why are the priorities assigned the way they are?

Are the objectives in line with our mission and vice versa?

HOW IS THE ACTIVITY ORGANIZED

What is the activity's organizational structure--both formal and informal?

Is the structure efficient as well as effective?

Are we doing a great job of performing the wrong requirements?

Table VII

Strategic Requirements Development(cont'd)

HOW IS SUCCESS DEFINED FOR THE COMMAND?

Has "success" been defined?

Is "success" viewed in terms of the CO's fitness reports, competitive functional area awards, fleet reputation, or the accomplishment of top manage- ment's goals?

WHAT ARE THE CRITICAL SUCCESS FACTORS (CSF'S)?

CSF's can be dynamic; should the activity's be updated?

Are the CSF's the or only indicators of organ- izational performance?

How have they been determined?

Do they coincide with areas that are presently dominating top management's time?

Are the CSF's measurable or quantifable? If not, how will they be measured?

Are department heads aware of the CSF's that their departments can influence?

Table VII (cont'd)

Strategic Requirements Development (cont'd)

HOW IS THE ACTIVITY EVALUATED?

By whom, how, present status?

How often is the is the evaluation done?

What areas have been identified as needing improvement?

Are evaluation results meaningful in identifying required information flows?

WHAT EVALUATED AREAS NEED SPECIAL ATTENTION?

Is it a true need or a nice to have item?

Are we spending 80% of our effort on 20% of the critical areas?

WHAT INFORMATION IS CRUCIAL?

What does the CC need?

What does the executive officer need?

What is needed by the department heads?

Is the information presently available?

How is the information supplied or obtained?

Is there a redundancy of data gathered in various functional areas?

Table VII

Strategic Requirements Development (cont'd)

DEFINE OBSTRUCTIONS

What obstructions, both tangible and intangible, impede the achievement of the activity's goals and objectives?

How can these obstructions be overcome?

Is there a better way of doing business?

Could some objectives be redefined?

DEFINE THE FUNCTIONAL AREAS

What are the functional areas?

Which functional areas are key to our way of doing business?

What are their objectives?

Do their objectives support the organizations goals and objectives?

How are their objectives measured? Are the measure- able?

TABLE VIII

Information Requirements Planning

<u>REVIEW STRATEGIC OBJECTIVES</u>

Are the objectives prioritized?

Are the objectives understood and supported by all department heads?

Are the objectives quantifable or are they subjective and open to interpretation?

<u>DEFINE THE THREE LEVELS OF MANAGEMENT.</u>

Top--CO, XO, Department Heads

Planning--CO, XO, Department Heads, Division Officers

Operating--Division Officers, CPO's, LPO's

<u>DESCRIBE THE INFORMATION NEEDS OF EACH LEVEL OF MANAGEMENT.</u>

Top--information needs for both today as well as the the future. Needs information that is effective and will assist in the decision making process.

Planning--information for evaluating the activity in the future. Trends, comparisons, and projections are of interest.

Operating--information for the day to day activities and responsibilities.

Table VIII

Information Requirements Planning (cont'd)

<u>CAN THE INFORMATION FLOWS BE IDENTIFIED FOR EACH LEVEL OF MANAGEMENT</u>?

Have these information flows been diagramed?

Has all data for the information flows within a functional area been identified as either independent, interdependent, or intradependent?

<u>REVIEW THE INFORMATION ROUTINELY PROVIDED TO THE COMMANDING OFFICER</u>.

Compare the information presently provided by each functional area with the information required by the CO (as identified in Strategic Requirements Development)

Review and analyze any discrepancies.

Is the information provided to the CO in a usable format?

Is the information provided solely as a CO need, or is the data required for other external/internal reports?

If the information is required for other reports, is the format altered prior to submission to the CO?

Table VIII

Information Requirements Planning (cont'd)

REVIEW THE INFORMATION OCCASIONALLY REQUIRED THE CO.

What information is required and who provides this information?

How often is this information required?

Is the information readily available, or does it require analysis and/or computations?

Could the information be included in a routine report to the CO? Is it cost effective to do so?

DEFINE THE INFORMATION REQUIRED BY THE EXECUTIVE OFFICER.

Apply the same type questions as for the CO.

DEFINE THE INFORMATION REQUIRED BY EACH DEPARTMENT HEAD

What information is routinely provided to the department head (i.e., daily or weekly)? How is this information used?

Is this information accumulated by the department head for daily, weekly, monthly or quarterly reports?

Is aggregate information also provided by various divisions/offices for these same reports?

Table VIII

Information Requirements Planning (cont'd)

<u>PRIORITIZE THE INFORMATION REQUIREMENTS OF:</u>

Commanding Officer

Executive Officer

Department Heads

<u>IDENTIFY ALL INFORMATION PRESENTLY PROVIDED BY AUTOMATED SYSTEMS</u>

Are the top priorities automated?

Has any form of cost benefit analysis been done on this automated system?

Is the system effective or does it merely provide a nice looking format or copy?

<u>IDENTIFY INFORMATION CONSIDERED TO HAVE THE MOST APPLICATION TO AN AUTOMATED SYSTEM.</u>

Is it automated? If not, why not?

TABLE IX
Information Analysis

IS TOP MANAGEMENT INVOLVED AND COMMITTED TO INFORMATION ANALYSIS?

Do the department heads understand the commitment and why?

Has the CO provided his interpretation of the activities direction?

Has the command been briefed as to the present status of IRM implementation, and the critical nature of the user's involvement to the Informantion Analysis step?

HAVE THE QUESTIONS FROM THE PREVIOUS STEPS BEEN REVIEWED AND THE ANSWERS/RESULTS BEEN VERIFIED?

HAS A POA&M BEEN DEVELOPED FOR THE INFORMATION ANALYSIS PROJECT TEAM?

Is the POA&M realistic?

Does it mesh with the overall implementation POA&M?

Are each of the six procedures covered by the POA&M?

Is the timeframe realistic?

Table IX

Information Analysis(cont'd)

<u>HAVE THE KEY DATA SUBJECTS FOR THE ACTIVITY BEEN IDENTIFIED</u>?

Does top management agree with these data subjects?

<u>HAVE INDIVIDUAL FUNCTIONAL AREA PROJECT TEAMS BEEN APPOINTED</u>?

Have these groups been briefed by the activity's project team?

Have project leaders been appointed?

Have functional area POA&M's been developed?

<u>HOW IS INFORMATION PROVIDED TO THE FUNCTIONAL AREA PROJECT GROUPS</u>?

<u>ARE THE FUNCTIONAL AREA PROJECT GROUPS "USER" GROUPS</u>?

Are members of the activity's project team dominating or overshadowing these groups?

Table IX
Information Analysis (cont'd)

<u>HAVE DATA SUBJECTS THAT HAVE BEEN IDENTIFIED AS NO LONGER BEENING NEEDED BEEN CAREFULLY SCREENED</u>?

Who will approve the fact that this data is no longer required?

<u>HAVE</u> "<u>STATUS QUO</u>" <u>OR</u> "<u>BUSINESS AS USUAL</u>" <u>TYPE DATA SUBJECTS BEEN CAREFULLY REVIEWED</u>?

Are they really necessary?

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